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A RECONNAISSANCE LIFE SCIENCE INVENTORY OF THE EMILY CREEK AREA OF NATURAL AND SCIENTIFIC INTEREST, VICTORIA COUNTY, ONTARIO

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Ontario Ministry of Natural Resources
Parks and Recreational Areas Section
Central Region, Aurora

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For convenience this report may be referred to as OFER 9001. It is one of a number of Open File Ecological Reports comprised of reconnaissance surveys and detailed inventories of ecological areas in Ontario.

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ABSTRACT

The Emily Creek ANSI is a large (1470 ha) wetland complex situated in the shallow channel of a former postglacial spillway. Deep peat deposits have accumulated, some as thick as 4 m . The continual flow of water from the strongly calcareous parent material of the surrounding till plain has encouraged the development of a fen complex on the wetland. The largest examples of graminoid fen, shrub-rich fen and treed fen vegetation in Site District 6-8 are found here.

The study area has been negatively affected by the raising and stabilization of water levels along the Trent - Severn Waterway into which it flows. The abundance of stumps in the water along Emily Creek indicates that forest cover was previously considerably more extensive.

Thirteen regionally significant plant speices were found to inhabit the Emily Creek ANSI. Caspian Terns, which are provincially significant birds, were observed migrating through the site.

The distance between the most important wetland areas here and the surrounding heavily developed agricultural land was found to be inadequate, especially in the vicinity of Emily Lake. It is recommended that landowners be encouraged to increase those distances through appropriate setbacks and, perhaps, natural regeneration of those setbacks.

The study area includes one of most extensive and diverse wetland complexes in Site District 6-8. This warrents its designation as a provincially significant ANSI.

PREFACE

A reconnaissance life science inventory of the Emily Creek Area of Natural and Scientific Interest ('ANSI') was undertaken in the early fall of 1989. The inventory was required in order to provide preliminary inventory and assessment data on the significant resources of the study area and to suggest directions for ecologically sensitive management of these resources.

ANSI areas often result from the provincial survey of life science and earth science natural areas undertaken by the Parks and Recreational Areas Program of the Ontario Ministry of Natural Resources in connection with park system planning. The mandate of these surveys stems from the protection objective of the Ontario Provincial Parks Policy (1978) which is " to protect provincially significant elements of the natural and cultural landscape of Ontario".

The overall objective of the natural areas survey is to identify a series of ecological areas which comprises the spectrum of natural landscapes, environments and biotic communities in Ontario. This objective issues from a cabinet - endorsed guideline of the 1978 Provincial Parks Policy which recognizes the role of provincial parks in protecting "a system of features representative of Ontario's life science history and diversity". The Emily Creek ANSI is one of these areas.

Although the general area has been the subject of life science investigations since the first of the famous "Lakefield trio" (Suzanna Moodie, Cartherine Parr Traill and John Langton) settled nearby in the early 19th century, the immediate area of the ANSI has been poorly studied. This study provides the opportunity for documenting the life science features in a poorly known area of Central Region.

The study was undertaken under the supervision of Central Region Ecologist John L. Riley, who provided the background file data, base maps and several items of important literature as well as handling the administrative requirements. Ontario Ministry of Natural Resources District Parks Supervisor George Scott also offered assistance and documentation. In addition, J. Kaiser, J. L. Riley and D. G. Cuddy kindly provided information and comment on the area from their investigations of the site in the past. J. L. Riley and S. Varga critically reviewed an earlier draft of this report.

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CHAPTER 1. REGIONAL BACKGROUND

This chapter is designed to provide a regional context into which the ecological and geographical characteristics of the Emily Creek Area of Natural and Scientific Interest (hereafter, "ANSI") study area can be placed. This will assist in the development of a better appreciation of the significance of particular resources within the study area.

(1) Location

The Emily Creek ANSI is situated south of Sturgeon Lake of the Trent-Severn Waterway, approximately 20 km northeast of Lindsay (Figure 1). The boundary between the sedimentary limestone and the metasedimentary and granitic Canadian Shield is less than 10 km to the north of the site. The site is approximately 1417 ha. in size and is centred at Latitude 44° 26' North, Longitude 78° 34' West.

The study area is contained within Emily and Verulum Townships in Victoria County, within the area of concern of the Kawartha Region Conservation Authority.

(2) Land Use

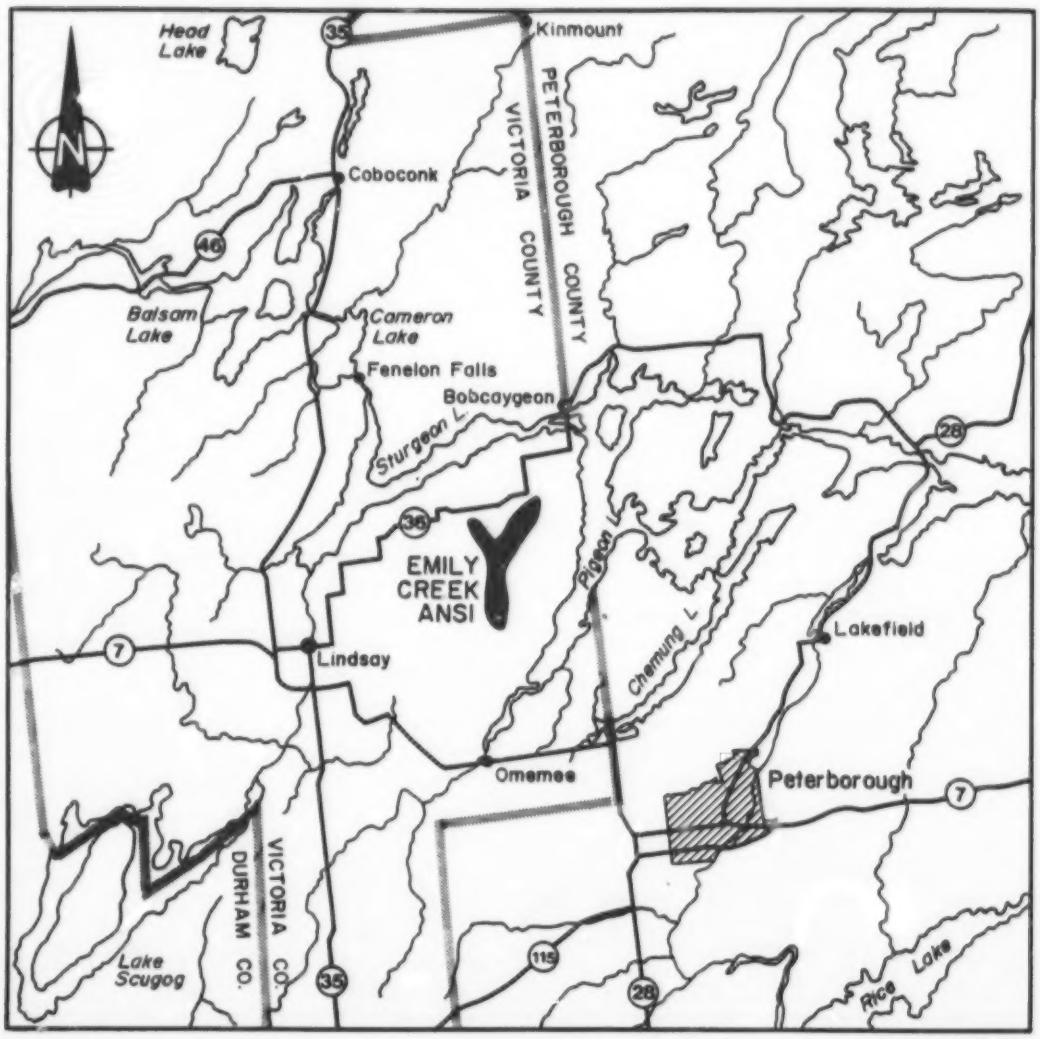
The ANSI stretches along almost 20 km of Emily Creek, running north from Fox's Corners at Victoria County Road 17 to Emily Lake and hence northwestward to Glenway Village trailer park at Highway 36 (Figure 2). Access to the edge of the wetland complex is possible along the road allowances extending beyond most east-west concession roads as well as several north-south concession roads crossing the northeastern arm of the wetland. Water access is provided at the north end of the area by Highway 36, offering shallow-water boating opportunities along the creek between the highway and Emily Lake. Beyond that point the site is posted as a 'No Tresspassing' Area by the owners, the Emily Creek Club Ltd. This group owns the wetland property from the southern shore of Emily Lake southward beyond Emily Township Road 14. The area from the southern shore of Emily Lake northward is crown land.

The main area of the wetland has been disturbed as a result of flooding for water-level control along the Trent-Severn Waterway into which Emily Creek empties. This flooding, apparently dating back to the late 1920s or 1930s (cf. CORTS 1971), has left an abundance of dead, standing tree trunks and stumps all along the creek and lakeshore. Except for dead stumps most of the wetland appears to be in a hydrological equilibrium with present water levels, although historically the wetland may have been quite different and probably was forested. Agricultural activity surrounds the site with open pasture running down to the creek shore. Cattle were observed wading along the creek shore at the north end of the study area, for example. There are no occupied residences within the boundaries of the ANSI.

Development close to shore is rare in most of the study area, being restricted to a hunt camp near Emily Township Road 14. Two roads, Emily Township Road 14 and Victoria County Road 17, cross the ANSI in an east-west direction. Verulam Township 10th Line Road is a gravel road that crosses the extreme northeastern arm of the ANSI, as does the cleared by undrivable allowance of Verulam Township Concession Road 9.

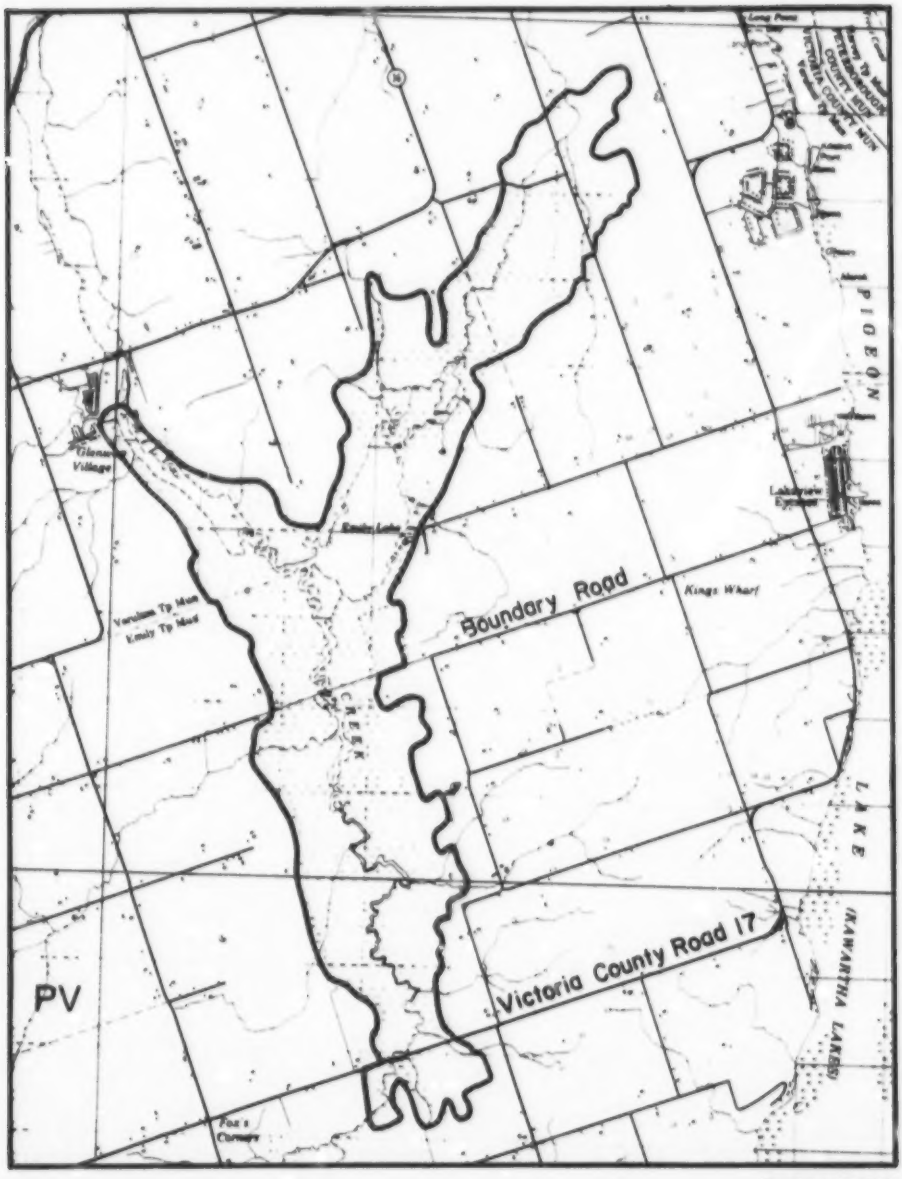
The wetland has long been considered an important site for hunting and fishing (CORTS 1971; Anonymous 1981). Duck blinds are evident in the Emily Lake area and along the creek.

Figure 1: Location of the Emily Creek ANSI in southern Ontario



Scale 1:500,000

Figure 2: Emily Creek ANSI Situation



3) Study Objectives

The objectives of this study are as follows:

i - to provide a preliminary (reconnaissance level) life science inventory of the Emily Creek ANSI.

ii - to assess the significant life science resources of the Emily ANSI and their contribution as representational or unique features satisfying the Ontario Ministry of Natural Resources life science protection objectives.

(4) Methodology

Collection and review of the pertinant life science literature concerning the Emily Creek ANSI study area was undertaken shortly after the preliminary administrational requirements of the study were satisfied Discussions with Ontario Ministry of Natural Resources personnel in the Regional and District Offices knowledgable of the study area were undertaken. A preliminary review of the stereo aerial photographs was conducted in order to obtain an overview of the site Searches of basic regional and provincial floral and faunal literature helped to identify potential significant elements.

The fieldwork was undertaken in one field period in early fall (September 12 through September 14). Black and white photographs were taken of major vegetation types and life science features and voucher specimens for significant or unknown plant species made. The vegetation was mapped in the field on 1:10,000 aerial scale photograph overlays, for conversion to a final composite in the office (see Map 1). Although field studies were undertaken too late in the season for breeding evidence to be established, observations of bird species were noted, as were incidental records of other mammal and herpetological fauna. Additional faunal data were extracted from literature sources (as cited). Time constraints were too great to permit detailed evaluation of fauna in any case.

The habitats in the Emily Creek ANSI study area were examined, with access being effected by canoeing along Emily Creek, driving along the peripheral road system and conducting occasional on-foot transects across parts of the study area. Access to the Emily Creek Club Ltd. property was prevented by the conspicuous posting of those lands.

Following field studies the plant voucher specimens and photographs were processed, sorted and identified as required. A review of the appropriate research literature was conducted at this time.

The draft report was prepared in February 1990 Following review of that draft by Regional and District Ontario Ministry of Natural Resources personnel, the final draft was prepared that incorporated the comments and criticisms of the review process.

(5) Previous Studies

In conducting a reconnaissance inventory of the Rideau-Trent-Severn Waterway in 1970, D.G. Cuddy considered the Emily Creek ANSI, although he was not able to examine the site directly and was required to rely on data from provincial wildlife personnel (D.G. Cuddy, perscomm.).

The site received a brief reconnaissance assessment as part of 1972 International Biological Program surveys, but no particularly unusual life science features were noted (White 1972). He includes a checklist of vascular plants observed (no vouchers collected) and concluded that the site was "a good example of those wetland associations typical of the region".

A life science checksheet prepared by R. Hanna in her Site District 6-8 assessment was based on White's report as well as her own aerial photo interpretation (Hanna 1980). She concluded that the site "..is one of the least disturbed, inaccessible, extensive and diverse swamps in Site District 6-8 ...".

Ontario Ministry of Natural Resources Lindsay District Fish and Wildlife Branch personnel (Anonymous 1981) identified the Emily Creek wetland as a significant Muskellunge and Large-mouthed Bass breeding area.

A wetlands evaluation of the site was conducted in 1983 that identified a number of significant species of plants and animals (though many were misidentified and/or inappropriately ranked). That study concluded that the size and significance of the site supported a Class 1 Wetland designation (KRCA 1985).

J. L. Riley surveyed one of the fens at the site on July 31, 1985 as part of the Ontario Geological Survey's peatland study (Riley 1988). He listed a variety of significant flora and made the comment that this was one of the best fen in southern Ontario (J.L. Riley, OGS Site Data Record 795, inlit.)

J. Kaiser undertook a reconnaissance survey of the ANSI in 1986 as part of a study of a series of candidate reserve areas. In addition to aerial photographic and on-site investigation of forest vegetation associations he identified (in lit.) a list of plant species and fauna observed. He included species reported in White (1972) and by Riley in 1985 to combine all of the available floristic data into one document.

A brief survey of the Atlas of the Rare Vascular Plants of Ontario (Argus *et al.* 1982-1987), the Breeding Bird Atlas of Ontario (Cadman *et al.* 1987) and the Ontario Herptofaunal Summary (Weller and Oldham 1978) indicates that the Emily Creek ANSI has received scant attention for field biologists and naturalists. This part of Ontario has a poorly documented flora in the first place (cfRiley 1989); the study area appears to have had even fewer data documented for it than for most of the general area.

CHAPTER 2. RESOURCE INVENTORY

This chapter provides a detailed discussion of the vegetation and flora of the study area. Faunal data are dealt with in the general assessment appropriate to the quantity of these data. An overview of the earth science situation is also presented in order to put life science features and systems into a better ecological framework.

1) Geology and Geomorphology

The entire area is underlain by 500,000,000 year old Ordovician limestone (Freeman 1979) upon which Wisconsin glaciation moraine deposits are situated. These deposits are part of a large till plain in the western portion of the Peterborough Drumlin Field, situated south of the massive Dummer Moraine complex that lies between the study area and the southern edge of the Canadian Shield on the northern side of Sturgeon Lake. The till is well drained, highly calcareous and stony Drumlins are abundant east of the study area but are less common here, being apparent in the study area only along the northern shore of Emily Lake.

Emily Creek originates in the Schomburg Clay Plains near Lindsay (a clay deposit of post-glacial lake origin) then meanders across the gently sloping till plain through an abandoned post-glacial spillway until it flows into the Trent River system at Sturgeon Lake (Chapman and Putnam 1986).

The Emily Creek ANSI was released from the cover of the Wisconsin glaciers about 12,500 years ago (Dyke and Prest 1986). The important Kirkfield Outlet of glacial Lake Algonquin, draining the western Great Lakes basin, ran west to east along the northern edge of the Dummer Moraine, cutting through it along spillways. These apparently included one which ran from Sturgeon Lake along the Emily Creek and on through to Rice Lake (Chapman and Putnam 1984). It then drained into Glacial Lake Iroquois (proto Lake Ontario) and thus to Glacial Lake Vermont (later occupied by a portion the Champlain Sea) (Dyke and Prest 1986).

This Kirkfield Outlet was active for about 1,000 years (12,000 to 11,000 years B.P.) and was one of two drainage channels in this outwash system for the upper Great Lakes Basin. It has been established that the Champlain Sea, which extended to within 200 km of the study area during its maximum extent (Freeman 1979; Chapman and Putnam 1986) had a distinctly arctic-subarctic environment (Harington 1989), suggesting that a cooler climate also affected the study area. The landscape of the Emily Creek ANSI about 11,500 years ago, then, was likely one of scrubby, Boreal or tundra-like shoreline vegetation along a major, cold-water river and fen-peatland, with extensive clearings of lichen-heath in a low, wind-sculptured forests of Jack Pine and Black Spruce along the backshore.

Amelioration of the climate and especially the climatic warming effected by the Hypsithermal period that extended from about 7,000 years BP to about 4,000 years B.P (McAndrews *et al.* 1987) encouraged the establishment of much of the existing upland vegetation and flora. The flooded, cool Emily Creek valley, however, retained extensive and deep organic deposits that sustain a vegetation with the basic character of subarctic-boreal, calcareous peatland vegetation as a relict of those post-glacial times. Almost 2 m of slightly acidic (surface pH 6.4) peat over a 2 m thick marl base has been measured here (J.L. Riley, OGS Site Data Record 795, inlit.).

By about 2,500 years BP the current landscape vegetation, both upland and lowland, was firmly established and the landscape stabilized.

2) Vegetation

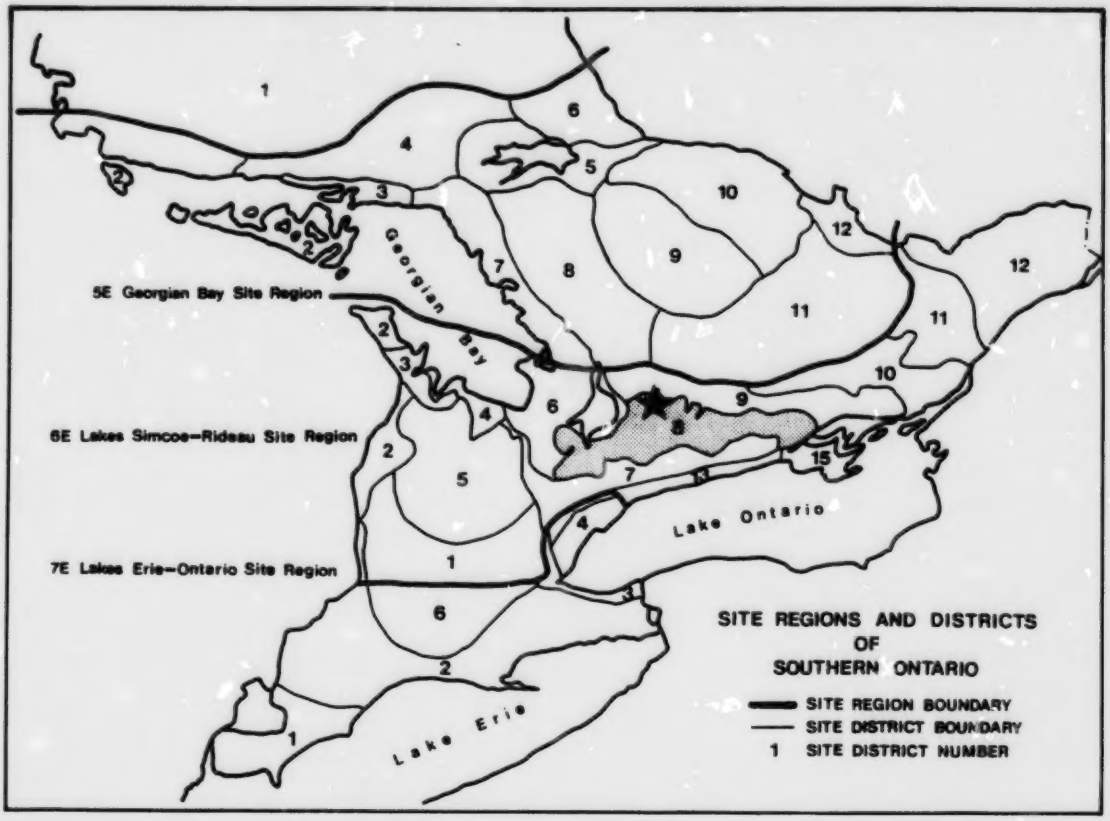
The Emily Creek ANSI study area is situated within the Huron-Ontario Forest District as described in Rowe (1972). This is a large area within the Great Lakes - St. Lawrence Forest Region in southern Ontario, extending from Manitoulin Island eastward to the Penetang Peninsula and across the northern edge ot the Ordovician lowlands to Kingston.

Hills' (1959) analysis of Ontario landscape and vegetation is based on different units from those in Rowe (1972). He divides Ontario into *Site Regions* (areas of land within which the response of the vegetation to the landform follows a consistent pattern) and *Site Districts* (areas within Site Regions with a characteristic pattern of physiographic features). He places the study area within the Peterborough Site District (6-8) of the Simcoe - Rideau Site Region (6).

Site Region 6 (Figure 3) is described as a landscape of gently undulating to rolling terrain of ice-lain materials deeply covering the bedrock, with local plains of lacustrine deposits and shallowly covered limestone plains (Hills 1959) American Beech, Sugar Maple and Eastern Hemlock characterize the ultimate forest type on fresh, normal sites, with oak and hickory on warmer sites Eastern Hemlock, White Cedar and Yellow Birch, with some spruce, typify wet sites. Although not stated by Hills (1959), another important characteristic is that much of the Site Region (including Site District 6-8) is situated on sedimentary bedrock, in contrast to the almost exclusively Precambrian bedrock-based Site Region 5 to the north and the exclusively sedimentary bedrock-based Site Region 7 to the southwest.

Hills (1959) describes the Peterborough Site District 6-8 (Figure 3) as "an area of very high lime loam (drumlinized till) with local areas of high to moderate low lime, water-laid silt and clay".

Figure 3: Site Regions and Districts in Southern Ontario



Much of the site district, including the area around the Emily Creek ANSI, has been severely disturbed by agricultural, industrial and residential development Chapman and Putman (1986) note that only 11% of farmland – the dominant land use of the Peterborough Drumlin Field – remains in a wooded condition. As well, between 20 and 40% of all wetland areas in Emily and Verulam Townships have been destroyed since the turn of the century (Snell 1987).

In this study the vegetation of the Emily Creek ANSI is divided into three large categories: Upland, Lowland and Open Wetlands. These are subdivided into groupings labelled by their life form and successional characteristics.

Nonforested and aquatic vegetation is categorized by the elements identified in the analysis of a large body of vegetation association data in southcentral Ontario (Brunton 1982), with reference to Riley (1988) for more precise descriptions of wetland units.

This system includes consideration of the regional site type matrix system often employed in Ontario Ministry of Natural Resources life science studies (Beechey and Davidson 1980) which employs the identification of dominant vegetation species as a means of labelling vegetation variation within a biophysical framework (the matrix). Representative vegetation formulae are included within the description of each vegetation type. The associations are also arranged within a Site Type Matrix for the Emily Creek ANSI (Figure 4).

The classification of the vegetation of the Emily Creek ANSI study area includes the following categories:

WETLAND VEGETATION

1 - Open Water Aquatics

2 - Cat-tail Marsh

3 - Open Graminoid Fen

4 - Open Shrub-rich Fen

5 - Thicket Swamp

FORESTED LOWLAND VEGETATION

6 - Successional Deciduous Swamp

7 - Successional Mixed Swamp

8 - Successional Coniferous Swamp

UPLAND VEGETATION

9 - Successional Mixed Forest

10 - Successional Deciduous Forest

11 - Mature Deciduous Forest

12 - Upland Meadows

13 - Developed Land

Figure 4: Vegetation Site Type Matrix for the Emily Creek ANSI

		ARID	VERY DRY	DRY	DRY MESIC	MESIC	WET MESIC	WET	VERY WET	SATU-RATED	OPEN WATER
COOLER	Rock										
	Sand									5a, 7a 7b	
	Loam										
	Clay										
	Organic									3a, 4a, 4b, 5c 8a, 8b, bc	
NORMAL	Rock										
	Sand				11a, 12a		9a		6a	5b, 6b 6c	1a, 1b 2a, 2b
	Loam										
	Clay										
	Organic										
WARMER	Rock										
	Sand										
	Loam										
	Clay										
	Organic										

The following vegetation descriptions treat each of the vegetation variations observed in the study area. The maps accompanying each vegetation type are not cartographically accurate and are intended only to provide a graphic image of that vegetation's representation Readers are referred to Map 1 (inside back cover) for an accurate and detailed delineation of the vegetation of the study area.

VEGETATION TYPE 1: OPEN WATER AQUATICS
(Figures 5 and 18)

Site: Emily Creek and Emily Lake support aquatic associations in sites which are cooler to normal in microclimate and are situated over thin sand and silt bottom and organic deposits

Vegetation Characteristics: A wide variety of diverse aquatic associations composed of floating and submerged vascular plant species in stands varying from densely packed to highly dispersed. The examples found along shallower portions of Emily Creek are most dense, virtually closing off the water coarse in some area. Eventual succession is towards swamp thicket, marsh and shrub–rich fen vegetation.

The vegetation associations recorded for this type are as follows:

1a) *Nuphar variegatum*[6] – *Sparganium americanum*[4]
(northwest of Emily Lake along creek)

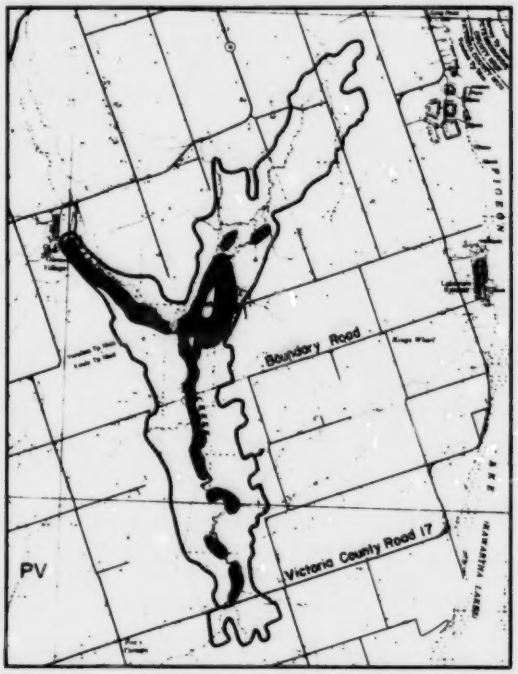
1b) *Vallisneria americanum*[4] – *Potamogeton natans*[3] – *Elodea canadensis*[3]
(northwest of Emily Lake along creek)

Characteristic flora in this vegetation includes:

Zizania palustris
Sagittaria latifolia
Calla palustris
Eleocharis palustris
Potomogeon zosteriformis
Potamogeton pectinatus
Vallisneria americana
Cladium mariscoides

Further Considerations: Two uncommon plant species are found in this habitat (*Potamogeton robbinsii* and *Zizania palustris*), offering a local level of life science significance. Although such aquatic associations are commonly represented in the site district and site region, the extent and quality of the vegetation type in the study area indicates a regional level of significance.

Figure 5: Vegetation Type 1 – Open Water Aquatics



VEGETATION TYPE 2 – CAT-TAIL MARSH
(Figures 6, 18 and 19)

Site: This vegetation lines portions of Emily Creek and Emily Lake, especially south of the lake and along its eastern and northeastern shore in normal to cooler, organic or sand-based, flooded site. Although restricted in extent marsh vegetation is conspicuous. Floating islets of the marsh mats occasionally break off and float elsewhere in the creek system.

Vegetation Characteristics: This marsh vegetation is dominated by cat-tail (*Typha latifolia*), Bulrush (*Scirpus cyperinus*), Canary-grass (*Phalaris arundinacea*), Wild Rice (*Zizania palustris*) with invading shrub species and a sparse associated flora. It is succeeding towards swamp thicket and shrub-rich fen and, ultimately, intolerant lowland forest.

The vegetation associations recorded for this type are as follows:

2a) *Typha latifolia*[10]
(northwest of Emily Lake along creek)

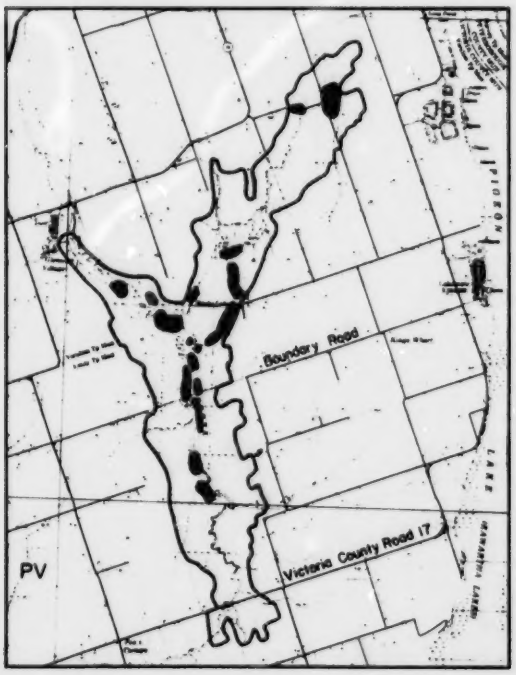
2b) *Typha latifolia*[7] – *Phalaris arundinacea*[3]

Typical ground vegetation includes:

Salix petiolaris	*Carex comosa*
Bidens frondosa	*Asclepias incarnata*
Eupatorium maculatum	*Mentha arvensis*
Lycopus uniflorus	*Scirpus cyperinus*
Aster puniceus	*Alisma trivale*

Further Considerations: This vegetation type is well represented in Site District 6-8 by the typical examples found in the study area. It is considered to support important faunal values as well three regionally significant plant species (*Zizania palustris, Wolffia borealis and Wcolumbiana*).

Figure 6: Vegetation Type 2 - Cat-tail Marsh



VEGETATION TYPE 3 – OPEN GRAMINOID FEN
(Figures 7, 20 and 21)

Site: Organic deposits of peat up to 2m deep overlaying ± 2 m of marl, in saturated, colder–than–normal situations identify the site for this vegetation; it is uncommon in the study area, being confined to younger peat mat areas north and west of Emily Lake.

Vegetation Characteristics: The peat mat is dominated by a variety of graminoids, especially the sedge *Carex lasiocarpa*, in wet peat with a surface water pH of 6.4 (Riley 1985, in lit.). Shrub cover is scanty although evidence of the former tree growth killed by past flooding is present in the form of stumps. The dominant bryophtyes at one location were *Drepanocladus revolvens* (70%), *Scorpidium scorpoides* (20%) and *Campylium stellatum* (10%0) (Riley, in lit., 1985). Open, shallow pools supporting a variety of aquatic plants are common on the mat.

The vegetation association recorded from this type is as follows:

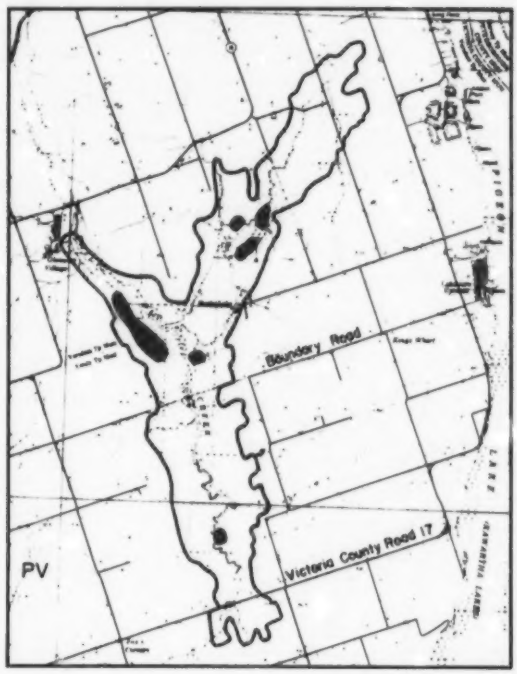
3a) *Carex lasiocarpa*[3] – *Myrica gale*[2] – *Solidago uliginosa*[1] – *Rhynchospora alba*[1] – *Muhlenbergia glomerata*[1] – *Typha latifolia*[1] – White Cedar (seedlings)
(west of Emily Lake)

Typical ground vegetation includes:

Galium labradoricum
Andromeda glaucophylla
Drosera rotundifolia
Menyanthes trifoliata
Sarracenia purpurea
Carex interior
Thelypteris palustris
Potentilla fruticosa
Agalinus paupercula
Thalictrum pubescens
Carex limosa
Aster borealis
Betula pumila
Bidens tripartita
Vaccinium macrocarpon
Spirodella polyrhiza

Further considerations: Peatlands are rare in southern ontario off the Canadian Shield (Riley 1989). This habitat constitutes less than 6% of the O.G.S Peatland Resources Study's 1,000,000 ha. Peterborough study area (Riley 1988). Bog and fen vegetation makes up only a small fraction of the peatland total, representing less than 0.2% of that study area (Riley 1988). There appears to be no comparable example of graminoid fen in the site district (Riley 1985, in lit.), providing considerable significance for this vegetation. The Goose Lake ANSI (Hanna 1980) includes this habitat but over a much smaller area and with a more calcium–rich vegetation. A number of regionally significant plant species are known form this vegetation type: *Cladium mariscoides, Eleocharis tenuis, Rhynchospora alba, Lobelia kalmii* and *Bidens tripatita.*

Figure 7: Vegetation Type 3 – Open Graminoid Fen



VEGETATION TYPE 4 – OPEN SHRUB–RICII FEN
(Figures 8 and 21)

Site: Organic deposits of peat up to 4m deep in saturated, colder–than–normal situations identify the site for this vegetation; it is common along the northwestern portion of Emily Creek and along the shores of Emily Lake.

Vegetation Characteristics: The peat mat is dominated by a variety of graminoid species and low shrubs. Many of the vascular plants normally considered typical of southern Ontario fens *Salix candida, Cladium mariscoides, Potentilla palustris, Galium labradoricum, Carex limosa, Triglochin maritimum*, etc– cfRiley 1989) are present here but in low numbers. An abundance of stumps remain from the previous forest cover which was killed by flooding Speckled Alder and White Cedar are common; they occasionally form large patches and indicate that much of the vegetation is succeeding towards thicket swamp and successional swamp vegetation. Open, shallow pools and shallow water along the edge of the vegetation at Emily Creek support a variety of aquatic plants, including an abundance of the shrub Water–willow (*Decodon verticillata*).

The vegetation associations recorded from this type are as follows:

4a) *Decodon verticillata*[5] – *Typha latifolia*[3] – White Cedar[2]
(northwest of Emily Lake along south side of Emily Creek)

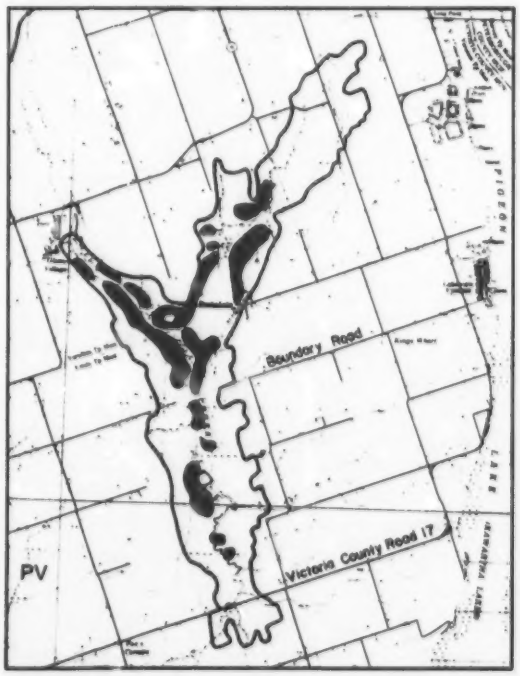
4b) Myrica gale[5] – White Cedar3 – *Typha latifolia*[2]
(northwest of Emily Lake along south side of Emily Creek)

Typical ground vegetation includes:

Thelypteris palustris	*Zizania palustris*
Iris vericolor	*Calla palustris*
Aster borealis	*Juncus nodosus*
Eleocharis tenuis	*Calamagrostis canadensis*
Salix candida	*Spiranthes romanzoffiana*
Vaccinium macrocarpon	*Ledum groenlandicum*

Further considerations: Peatlands are rare in southern ontario off the Canadian Shield (Riley 1989). This habitat constitutes less than 6% of the O.G.S. Peatland Resources Study's 1,000,000 ha Peterborough study area (Riley 1988). Bog and fen vegetation makes up only a small fraction of the peatland total, representing less than 0.2% of that study area (Riley 1988). This apparently is the most extensive example of shrub-rich fen in the site district (Riley 1985, in lit.). Thus, despite the disturbed nature of the vegetation, it has considerable regional significance. At least two regionally significant plant species (*Juncus pelocarpus* and *Cladium mariscoides)* occur here.

Figure 8: Vegetation Type 4 - Open Shrub-Rich Fen



VEGETATION TYPE 5 – THICKET SWAMP
(Figures 9, 22 and 23)

Site: This vegetation type is found abundantly along Emily Creek in the area affected by previous flooding. It is also found in tiny sites at the margins of most wet areas throughout the study area. It occurs in saturated, cooler situations on thin sand and (especially) organic deposits.

Vegetation Characteristics: A tangled complex of deciduous shrub species (dogwood, willow, Speckled Alder) dominates, with a ground flora of marsh and shrub–rich fen species. It completely closes off narrow sections of Emily Creek in the south of the study area. It ultimately succeeds to successional deciduous and mixed lowland swamp.

The vegetation associations recorded for this type are as follows:

5a) Speckled Alder[4] – White Cedar[3] – *Viburnum lentago*[2]
(northwest shore of Emily Lake)

5b) Speckled Alder[5] – Willow spp.[5]
(north side of cross–road to 10th line road)

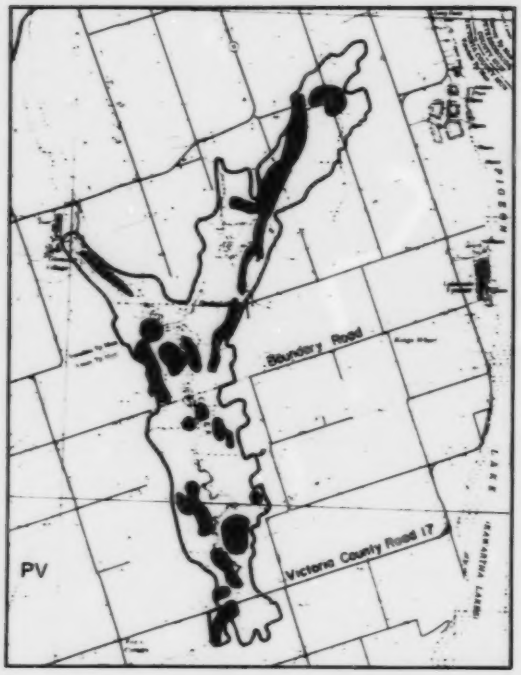
5c) Speckled Alder[8] – *Myrica gale*[2] – *Salix petiolaris*[2]
(along 9th line allowance northeast of Emily Lake)

Typical species in this vegetation include:

Salix petiolaris	*Salix bebbiana*
Eupatorium maculatum	*Ilex verticillata*
Cornus stolonifera	*Cicuta bulbifera*
Impatiens capensis	*Asclepias incarnata*
Glyceria striata	*Eupatorium perforatum*

Further Considerations: This vegetation type is common in the site district but the examples in the study area are the largest known and the only extensive representatives of this vegetation on peatland (cfRiley 1988); the vegetation is regionally significant from that perspective.

Figure 9: Vegetation Type 5 – Thicket Swamp



VEGETATION TYPE 6 – SUCCESSIONAL DECIDUOUS SWAMP
(Figure 10)

Site: These areas are spring–flooded and wet to saturated through the rest of the growing season, with silty alluvial–loamy soil in normal to cool situations. It is uncommon in the study area.

Vegetation Characteristics: Black Ash is the most common tree species, with Silver Maple and White Elm being secondary. Undergrowth is dense and dominated by a tangle of shrubbery such as Speckled Alder, Red–osier Dogwood, Choke Cherry and Poison–ivy, with a diversity of wet–site herbaceous flora below it. Succession is towards successional mixed and, eventually, to mature coniferous forest.

The vegetation associations recorded for this type are as follows:

6) Black Ash[8] – Speckled Alder[2]
(north side of cross–road to 10th line road)

6b) Black Ash[10]
(west side of 10th line Road)

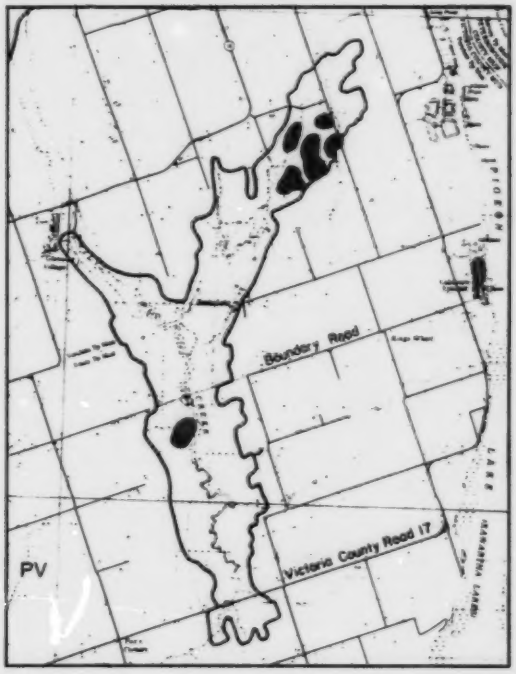
6c) Silver Maple[6] – Black Ash[4]
(west side of 10th line Road)

Typical ground vegetation includes:

Toxicodendron rydbergii
Cornus stolonifera
Pilea pumila
Ribes americanum
Smilacina racemosa
Parthenocissus vitacea
Eupatorium maculatum
Viburnum opulus
Aster lateriflorus
Glyceria striata

Further Considerations: The habitat is uncommon here. It is representative of Black Ash swamp vegetation elsewhere in Site District 6-8 (S.Varga, perscomm.).

Figure 10: Vegetation Type 6 - Successional Deciduous Swamp



VEGETATION TYPE 7 - SUCCESSIONAL MIXED SWAMP
(Figures 11 and 24)

Site: These areas, like those in Vegetation Type 8 (above), are spring-flooded and saturated through the rest of the growing season. A shallow to deep organic layer characterizes the substrate in these cooler sites. The vegetation is uncommon in much of the study area but is abundant in the southern and northeastern extensions.

Vegetation Characteristics: White Cedar and Balsam Fir dominate, with Black Ash, Balsam Poplar and White Elm being locally important secondary species. The saturated organic substrate supports a dense shrub vegetation including Red-osier Dogwood and Speckled Alder. A diverse herbaceous vegetation covers the ground layer.

The vegetation associations recorded for this type are as follows:

7a) Balsam Poplar[4] - White Cedar[3] - Balsam Fir[2] - White Elm[1]
(west side of 10th line Road)

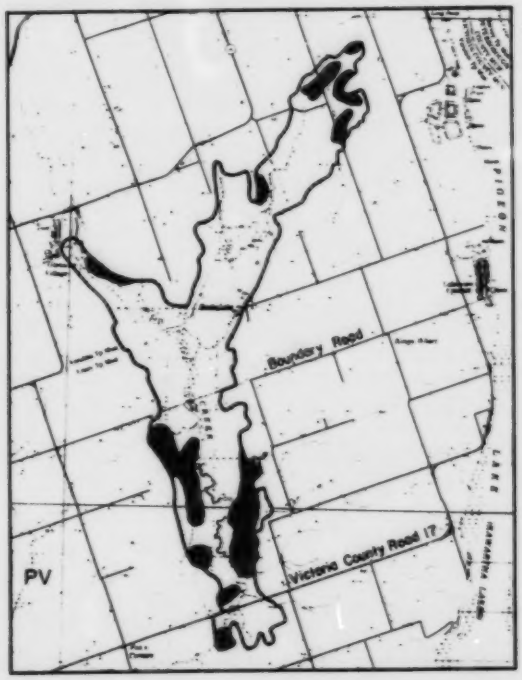
7b) Balsam Poplar[7] - Balsam Fir[2] - White Cedar[1]
(west side of 10th line Road)

Typical ground vegetation includes:

Aster puniceus
Parthenocissus vitacea
Cornus stolonifera
Salix bebbiana
Solanum dulcamara
Eupatorium maculatum
Solidago rugosa
Dryopteris cristata
Sambucus canadensis
Rhamnus alnifolius

Further Considerations: The vegetation contains no particularly uncommon elements. It is considered to be representative of younger lowland swamp forests in Site District 6-8 (Hanna 1984).

Figure 11: Vegetation Type 7 - Successional Mixed Swamp



VEGETATION TYPE 8 - SUCCESSIONAL CONIFEROUS SWAMP
(Figures 12, 25 and 26)

Site: Older, firmer areas of the peat deposits form the substrate for these cooler-than-normal, wet to saturated sites of treed fen; this is the most common vegetation type in the study area, covering large areas in all sections of the Emily Creek ANSI.

Vegetation Characteristics: This treed fen vegetation is dominated by White Cedar and Balsam Fir, with Larch being locally important. The undergrowth varies from dense tangles of Speckled Alder shrubbery and a diversity of herbaceous species in more open sites to sparsely-vegetated moss mats covered by dense 'thickets' of trees with intertwined branches.

The vegetation associations recorded for this type are as follows:

8a) White Cedar[8] - Balsam Fir[4]
(west side of 10th line Road)

8b) Larch[7] - Speckled Alder[2] - White Cedar[1]
(along 9th line allowance northeast of Emily Lake)

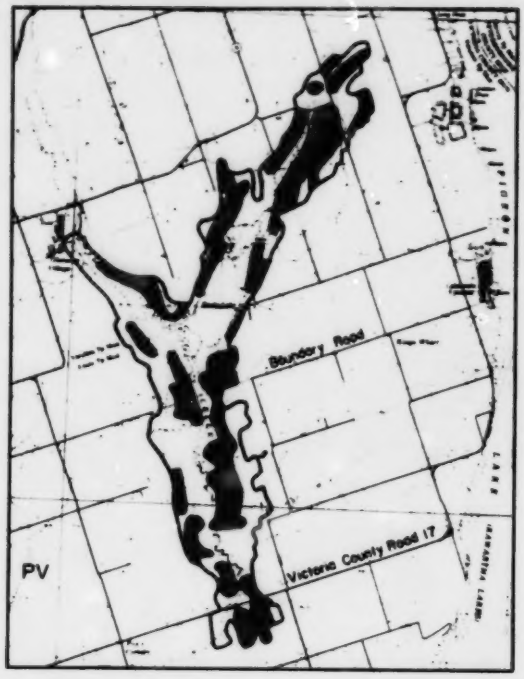
8c) White Cedar[8] - Larch[2]
(along 9th line allowance northeast of Emily Lake)

Typical ground vegetation includes:

Scutellaria galericulata
Muhlenbergia mexicana
Cornus stolonifera
Rubus pubescens
Osmunda regalis
Poa palustris
Aralia nudicaulis
Lysimachia ciliata
Onoclea sensibilis
Rhamnus alnifolius
Ribes lacustre
Cornus canadensis
Lonicera oblongifolia
Toxicodendron rydbergii

Further Considerations: This vegetation type comprises a large proportion (29%) of peatland areas in the 1,000,000 ha Peterborough study area of the O.G.S. Peatland Resources Study (Riley 1988). It is well represented within in the Emily Creek ANSI. Two regionally significant plant species, *Geocaulon lividum* and *Ribes lacustre*, are found in this vegetation type.

Figure 12: Vegetation Type 8 – Successional Coniferous Swamp



VEGETATION TYPE 9 – SUCCESSIONAL MIXED FOREST
(Figures 13 and 26)

Site: The intermediate vegetation of the habitat is reflected in its intermediate site conditions between the dry, largely developed uplands beyond the study area and the wetland systems within it; sites are normal, in thin sandy soil. It is found especially on sloping land and is most conspicuous along the northern edge of the study area and near Boundary Road.

Vegetation Characteristics: Trembling Aspen, White Spruce, White Cedar, and White Birch dominate, with hardwood species being the most important. A tangled undergrowth of shrubs and herbaceous species is evident. It will succeed to tolerant upland forest.

The vegetation association recorded for this type is as follows:

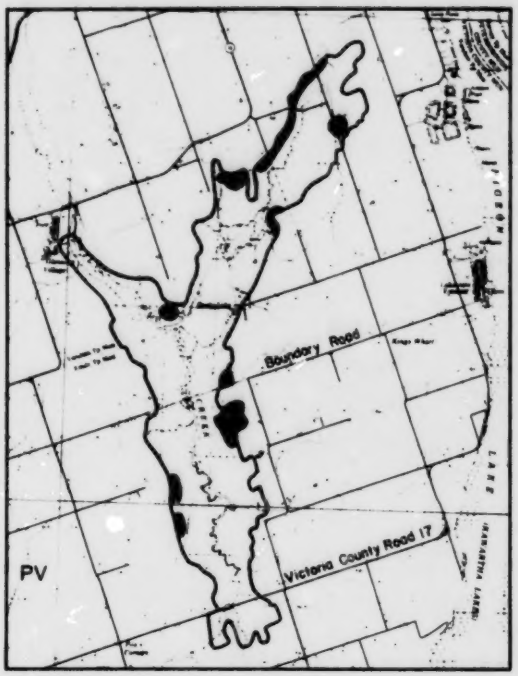
9a) Trembling Aspen[5] – White Birch[2] – White Spruce[2] – White Cedar[1]
(west side of 10th line Road)

Typical ground vegetation includes:

Pteridium aquilinum	*Rubus odoratus*
Aralia nudicaulis	*Maianthemum canadense*
Dryopteris carthusiana	*Ribes cynosbati*
Aster ciliolatus	*Solidago canadensis*

Further Considerations: There was one regionally significant plant species found here (*Ranunculus flabellaris*). The vegetation type, found commonly in the site district, is not considered to be significant.

Figure 13: Vegetation Type 9 – Successional Mixed Forest



VEGETATION TYPE 10 – SUCCESSIONAL DECIDUOUS FOREST
(Figure 14)

Site: This rare association is found in dry, shallow, sandy soil at the highest elevations (at the margins) of the study area, in normal microclimatic conditions.

Vegetation Characteristics: A combination of shade tolerant and intolerant hardwoods, including Trembling Aspen, Sugar Maple, White Birch and Basswood dominate. Undergrowth shrubbery and herbaceous vegetation is probably dense[1], judging from comparable sites elsewhere in the general area.

It was not possible to secure vegetation association data other than Forest Resource Inventory map information and, in the absence of on-site inspections, no ground vegetation data were recorded for this type.

Further Considerations: Although uncommon here because of the primarily wetland conditions of the study area, examples of this vegetation are common in woodlands in the general area and the site district. The regionally significant plant species *Ranunculus flabellaris* is found here. It is not considered to be a significant vegetation type.

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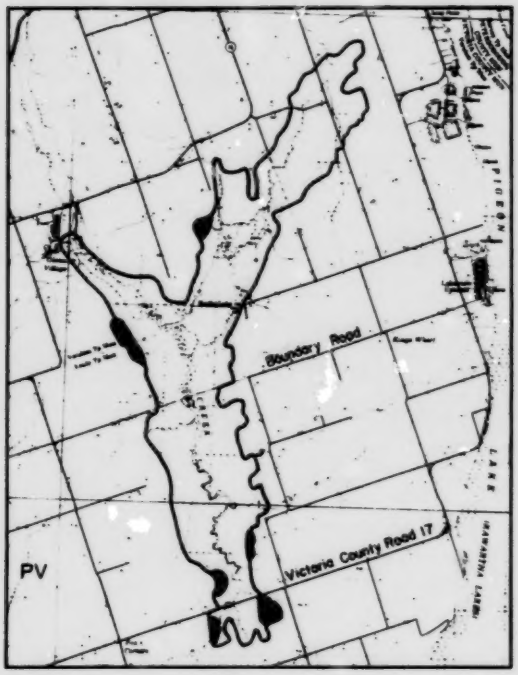
[1] These sites were noted on Forest Resource Inventory maps and/or visually from a distance; access limitations or posting of private property preventing on-site examinations.

Figure 14: Vegetation Type 10 - Successional Deciduous Forest



VEGETATION TYPE 11 - MATURE DECIDUOUS FOREST
(Figure 15)

Site: The vegetation occurs on the deep, well-drained dry-mesic to mesic, sandy-loam soil on a drumlin deposit in a normal site. It is known only from one 4 ha site in the northeastern corner of the study area.

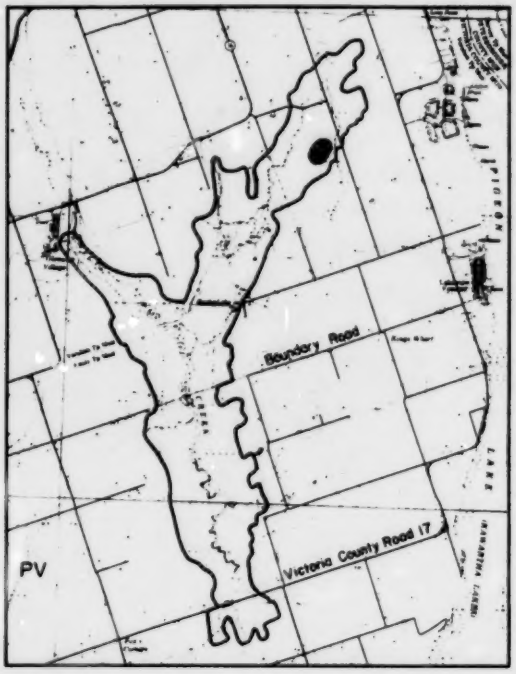
Vegetation Characteristics: This vegetation is dominated by submature (70 year old) Sugar Maple Posting of private land prevented a close approach to the site, so ground vegetation characteristics are unknown.

The vegetation association recorded for this type is as follows:

11a) Sugar Maple[10]
(west of 10th line road)

Further Considerations: This vegetation is restricted and underrepresented in the site district, but the potential representational significance of this example is reduced by its small size and young age.

Figure 15: Vegetation Type 11 - Mature Deciduous Forest



VEGETATION TYPE 12 - UPLAND MEADOWS
(Figure 16)

Site: It is found in dry to dry-mesic sandy sites on ice contact deposits (drumlin and possibly esker) and is rare in the study area, although anything but uncommon in the surrounding area.

Vegetation Characteristics: This vegetation is a reflection of the origin of the habitat, *viz*, a product of human disturbance of the upland landscape. Non-native species dominate Agricultural species such as various pasture grasses, are common. This vegetation is rare in the predominantly wetland-based study area; it succeeds into thicket and intolerant forest vegetation types.

The vegetation association recorded for this type is as follows:

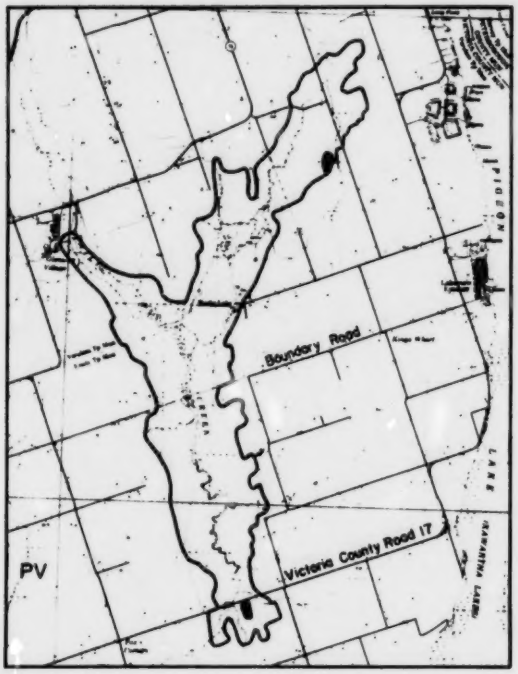
12a) *Bromus inermis*[7] - *Solidago canadensis*[3]
(south side of Victoria County Road 17 east of Emily Creek)

Typical ground flora includes:

Rubus strigosus
Potentilla norvegica
Asclepias syriaca
Daucus carota
Virgulus novae-angliae
Echium vulgare
Aster lanceolatus
Potentilla argentea
Hypericum perforatum
Solidago nemoralis

Further Considerations: This vegetation is transitory in nature, results from human-induced disturbances and is of no particular life science significance.

Figure 16: Vegetation Type 12 - Upland Meadows



VEGETATION TYPE 13 - DEVELOPED LAND
(Figure 17)

Site: Various upland sites in association with roadways, such as parking areas, roadways and shoulders, etc. are found in a few places where transportation corridors cross the study area; this vegetation occupies a very small proportion of the Emily Creek ANSI site.

Vegetation Characteristics: It is dominated by a wide variety of non-native plant species, reflecting the destruction of the native vegetation in these sites and the development of an artificial landscape.

Typical species include:

Chrysanthemum leucanthemum
Agropyron repens
Trifolium spp.
Polygonum achoreum
Hypericum perforatum
Taraxacum officinale
Plantago major
Poa pratensis

Further Considerations: This vegetation is of limited biological significance, beyond that of possibly impacting on natural habitats.

Figure 17: Vegetation Type 13 – Developed Land

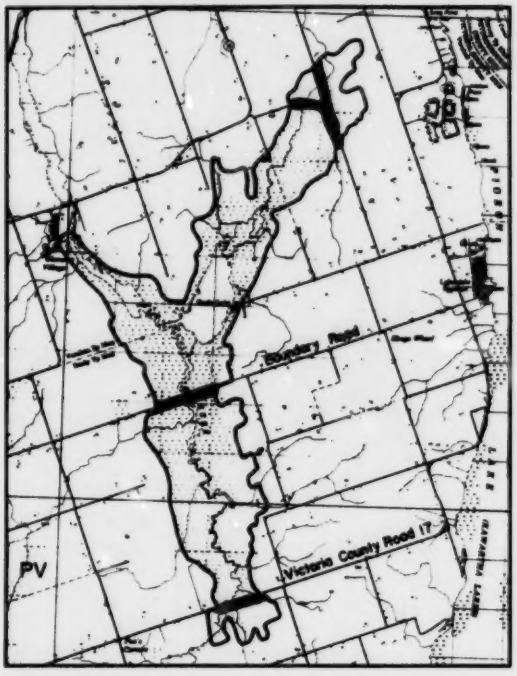


Figure 18: Open Water Aquatics before cat-tail (Typha) marsh (Emily Creek at Broundary Road)

Figure 19: Cat-tail Marsh (Emily Creek at Boundary Road)

Figure 20: Open Graminoid Fen (west of Emily Lake)

Figure 21: Shrub–rich Fen before Open Graminoid Fen with White Cedar – Black Spruce swamp in background (west of Emily Lake)

Figure 22: Speckled Alder – Sweet Gale Thicket Swamp (along 9th Concession allowance)

Figure 23: Willow – Speckled Alder Thicket Swamp before Trembling Aspen – Balsam Fir vegetation (North side of cross road west of 10th line road)

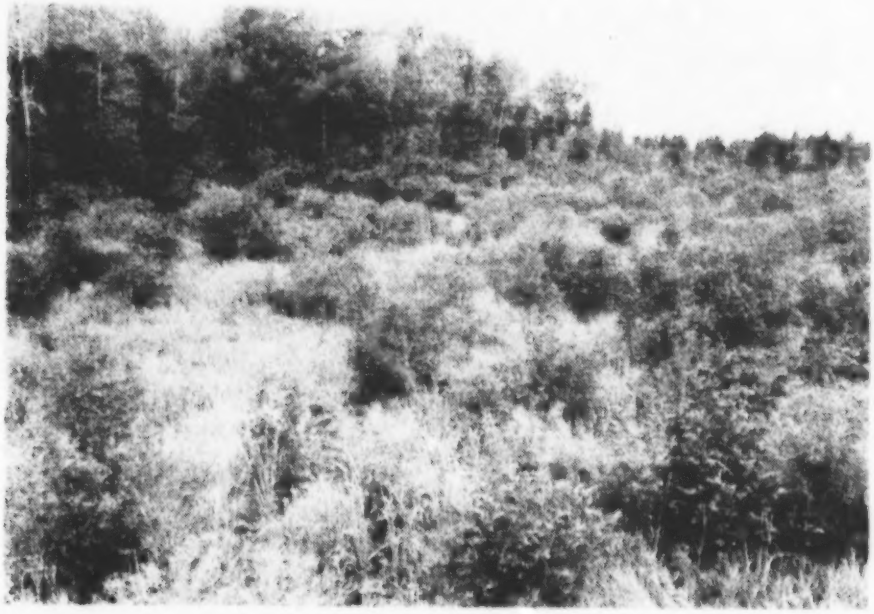


Figure 24: Mixed Balsam Poplar – Balsam Fir – White Cedar swamp (south side of cross road west of 10th line road)

Figure 25: Larch – White Cedar treed fen with dense Speckled Alder undergrowth (south side of 9th Concession Allowance)

Figure 26: Interior of White Cedar – Balsam Fir swamp (north side of Boundary Road)

3) Floristics

Approximately 370 species of vascular plants were recorded during the present investigation of the Emily Creek ANSI (Appendix A). The majority of these taxa are typical for the Peterborough - Durham section of Ontario Ministry of Natural Resources Central Region (Riley 1989).

Examples that illustrate the floristic affinities of the flora of the Emily Creek ANSI study area are indicated below.

Northern Affinity

Several species found in the study area have ranges typically extending over a wide area of the Boreal forest of northern Ontario and are near (or at) the southern limit of their range here:

Geocaulon lividum
Bidens beckii
Eleocharis tenuis
Bidens tripartita
Betula pumila
Carex limosa

These plants are found in the cool, wet, slightly acidic fen and treed fen areas along Emily Creek and are regularly recorded in fens in central Ontario and the northern portion of southern Ontario (cfRiley 1989).

Southern Affinity

Few species normally found across the sedimentary lowlands of southern Ontario and/or the northeastern United States that are at or very near the northern limit of their ranges were observed in the Emily Creek ANSI. They are:

Ranunculus flabellaris
Wolffia borealis
Wolffia columbiana
Cornus amomum
Cuscuta gronovii
Decodon verticillata

These are found in the least boggy wetland habitats and at the edges of the wetlands, perhaps resulting from migration along the margins of the Emily Creek system during past periods of warmer climate.

Special Habitats

A number of species typically found in open graminoid fens in southern Ontario (Riley 1989) occur in the open graminoid fen and shrub-rich fens along Emily Creek and the shores of Emily Lake.

Muhlenbergia glomerata
Carex lasiocarpa
Salix candida
Eleocharis tenuis
Lobelia kalmii
Vaccinium macrocarpon
Rosa palustris
Carex limosa
Agalinus pauperculus
Potentilla fruticosa
Aster borealis
Spiranthes romanzoffiana

Introduced Flora

Over 45 species (approximately 16%) of the recorded flora of the Emily Creek ANSI study area is non-native in origin. That is somewhat lower than the usual range (20 - 25%) for the alien component of wild lands across southern Ontario. They are found primarily in upland habitats in the study area and only sparingly in aquatic vegetation associations. Introductions are most common along roadways and in open meadow sites. Typical species include:

Trifolium spp.
Epipactis helleborine
Myriophyllum spicatum
Daucus carota
Agropyron repens
Rumex crispa
Melilotus alba
Phleum pratense
Lythrum salicaria
Taraxacum officinale
Potentilla recta
Hypericum perforatum

4) Fauna

There were insufficient resources available to permit the evaluation of faunal data at the same levels as those of floral and vegetational features and associations. Faunal data were gathered incidentally in conjunction with the floristic/vegetational investigation and were also assembled from established literature sources.

BIRDS

While approximately 200 species of birds likely migrate through or nest in the study area (cfGodfrey 1986; Cadman *et al.* 1987), much fewer than that number were observed during the present study (Appendix B). The late season nature of these studies - well after the breeding season and when migration was well advanced - further reduced the scope of observations.

Four species recorded here, Ring-necked Duck, Black Tern, Caspian Tern and Philadelphia Vireo are regionally significant.

MAMMALS

Few mammal sightings were made during the investigations and none of these were of significant species (Appendix C).

AMPHIBIANS AND REPTILES

Appendix D lists the amphibian and reptile species noted during the study, as well as those which contain the study area within their range (Oldham *et al.* 1988; Plourde *et al.* 1988). All are considered typical of the general area.

CHAPTER 3. SIGNIFICANT FEATURES

The character of the natural environment of the study area and the life science features observed in it have been described in the Previous chapter, Resource Inventory (Page 6). The significance of these features and particular life science characteristics of the study area will be discussed and evaluated here in order to put the life science significance of the study area into a larger context.

1) Significant Vegetation

Three of the vegetation types identified in the study area can be considered significant at a Provincial level. They are as follows:

Vegetation Type 4: Open Graminoid Fen

There appear to be no comparably-sized examples of this vegetation elsewhere in Site District 6-8 (Hanna 1980; Riley 1988), although the Goose Lake ANSI does contain significant fen areas. The vegetation shows the influence of former water level change along the creek system, but this remains the best known example in the site district.

Vegetation Type 3: Open Shrub-rich Fen

As for Open Graminoid Fen vegetation (above), there appears to be no better example of this vegetation elsewhere in Site District 6-8 (Hanna 1980; Riley 1988). It too shows the influence of former water level change along the creek system and to even a greater degree than for the Open Graminoid Fen vegetation, but it remains the best known example.

Vegetation Type 8: Successional Coniferous Swamp

Once again, like the previous vegetation types, the spruce, cedar dominated treed fen along Emily Creek provide the largest, most natural examples of their vegetation known in the site district, which affords them considerable representational and ecological significance (see criteria, above). These swamp forests are perhaps the least disturbed of any vegetation associations recorded in the Emily Creek ANSI.

2) Significant Flora

This section will provide a more detailed discussion of the particularly significant plant species that are known from the Emily Creek ANSI study area. A listing of all species observed is contained in Appendix A.

The levels of floristic significance are as follows:

PROVINCIAL - listed in Argus *et al.* (1982 - 1987) as rare in Ontario.

REGIONAL - listed in Riley (1989) as rare (or previously unknown) in the Peterborough - Durham portion of the Ontario Ministry of Natural Resources Central Region.

LOCAL - few records or previously unknown in the immediate vicinity of the Emily Creek ANSI study area (including non-native taxa).

PROVINCIALLY SIGNIFICANT FLORA

No provincially significant flora have been identified in the study area. One provincially (and nationally) rare taxon, *Sagittaria graminea varcristata* was listed by Kaiser (in lit.), but he did not secure a voucher for the record. He did recall details of the specimens observed and felt it best to treat the report at the species level (J.Kaiser, perscomm.). At that level the taxon is not considered rare.

REGIONALLY SIGNIFICANT SPECIES

The following 13 species from the Emily Creek ANSI study area are Regionally significant:

1) *Potamogeton robbinsii*
2) *Zizania palustris*
3) *Cladium mariscoides*
4) *Eleocharis tenuis*
5) *Rhynchospora alba*
6) *Wolffia borealis*
7) *Wolffia columbiana*
8) *Juncus pelocarpus*
9) *Geocaulon lividum*
10) *Ranunculus flabellaris*
11) *Ribes lacustre*
12) *Lobelia kalmii*
13) *Bidens tripartita*

Regionally significant flora are those ***native*** species listed as rare in Central Region (Riley 1989) or new for the Peterborough-Durham portion of Central Region.

1) ***Potamogeton robbinsii*** **(Robbin's Pondweed)**

[New Peterborough - Durham area record]

This transcontinental boreal species is common on the Canadian Shield in the southcentral portion of Ontario (Riley 1979; Dobson and Catling 1983) but is rarely found on the sedimentary lowlands of southern Ontario. It is otherwise known in Central Region only from Simcoe County (Riley 1989). A large population was found in shallow, fresh water at the north end of the Emily Creek ANSI study area (Vegetation Type 1).

2) ***Zizania palustris*** **(Wild Rice)**

[New Peterborough - Durham area record]

Although a common element of fresh flowing, nutrient-rich and ± calcareous waters in eastern Ontario (from the Ottawa River to the Trent - Severn system) this tall marsh grass is uncommon in Central Region west of the study area (Dore and McNeill 1980; Riley 1989b). It is common - even dominant - over a large area of Emily Creek (Vegetation Types 1 and 2) northwest of Emily Lake.

3) ***Cladium mariscoides*** **(Twig-rush)**

[New Peterborough - Durham area record]

This wetland sedge is widespread in areas of the Canadian Shield to the north and east but is rare in much of Central Region (Riley 1989b); it is a frequent component of fen meadows (Riley 1989) and is in such graminoid fen habitat (Vegetation Type 3) where it is most common in the study area.

4) ***Eleocharis tenuis var. borealis*** **(Northern Spike-rush)**
(= *Eleocharis elliptica*)

[New Peterborough - Durham area record]

A widespread northern fen species, this obscure little sedge is a commonly encountered in calcareous peatlands in southern Ontario (Brunton 1989). It is rare in Central Region east of Toronto (Riley 1989). It is common in open graminoid fen (Vegetation Type 3) in the study area.

5) ***Rhynchospora alba*** **(White Beak-rush)**

[New Peterborough - Durham area record]

Much like *Eleocharis tenuis* (above), this sedge is found regularly in fens and less-acidic wet peatlands across southern and central Ontario (Riley 1989); it is common in graminoid fens (Vegetation Type 3) along Emily Creek.

6) ***Wolffia borealis*** **(Water-meal)** (Figure 27)

[New Peterborough - Durham area record]

This tiny aquatic, usually found growing with *W. columbiana* (below), was long thought to be a restricted southern species of almost Carolinian Zone distribution in Canada (Dore 1957; Soper 1962). Aquatic wildlife and especially waterfowl, apparently play a major role in the distribution of these species (Dore 1957) and may explain the discovery of many new stations along and beyond the known northern limit of range in Ontario in recent years (pers. obs.). These constitute the smallest flowering plant in the world and have only been observed in the flowering state in Canada on two occasions (Thomson 1970; Hanes 1971). It was found in great abundance on shallow, quiet water of a shrubby marsh on the east side of the 10th line Road.

Although not listed here in Riley (1989), Soper (1962) indicates Peterborough Country records for *W. borealis*. This constitutes the first record of the species in Victoria County.

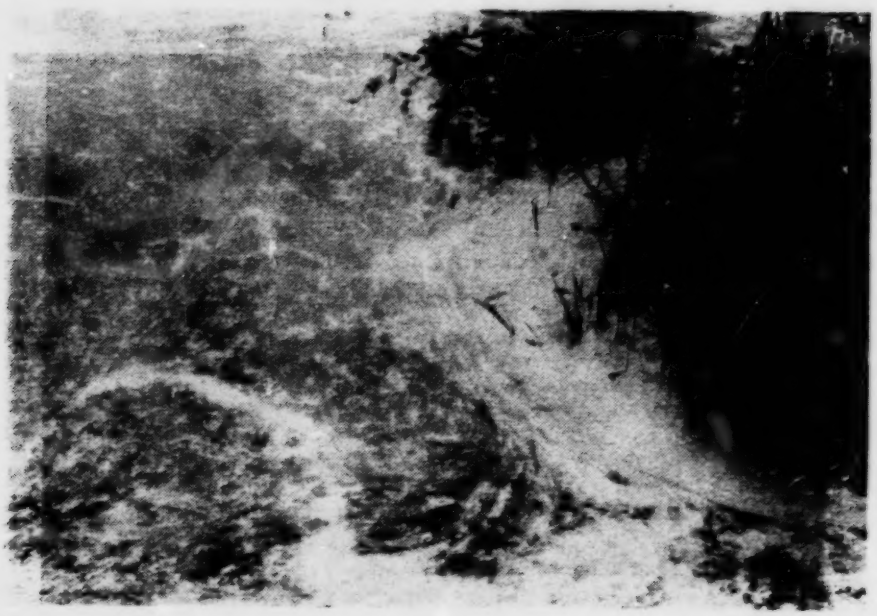
7) ***Wolffia columbiana*** **(Water-meal)** (Figure 27)

[New Peterborough - Durham area record]

This tiny aquatic, usually found growing with *W. borealis* (above), was long thought to be a restricted southern species of almost Carolinian Zone distribution in Canada (Dore 1957; Soper 1962). Aquatic wildlife and especially waterfowl, apparently play a major role in the distribution of these species (Dore 1957) and may explain the discovery of many new stations along and beyond the known northern limit of range in Ontario in recent years (pers. obs.). These constitute the smallest flowering plant in the world and have only been observed in the flowering state in Canada on two occasions (Thomson 1970; Hanes and Hanes 1971). It was found in great abundance on shallow, quiet water of a shrubby marsh on the east side of the 10th line Road.

Although not listed here in Riley (1989), Soper (1962) indicates Peterborough Country records for *W. columbiana*. This constitutes the first record of the species in Victoria County.

Figure 27: Watermeal (Wolffia borealis and W. columbiana) floating on the water surface (east side of 10th Line Road)



8) *Juncus pelocarpus* (Mud Rush)

[New Peterborough - Durham area record]

Like *Potamogeon robbinsii* (above), this species of peaty shores and wet, slightly acidic organic deposits is common across the Canadian Shield in southern and central Ontario (and across northern Ontario) from a predominantly eastern-maritime Boreal distribution. It is unrecorded in Central Region outside of Simcoe County (Riley 1989), but this likely reflects the intensity of searching along the southern edge of the Canadian Shield rather than actual distribution. It was found uncommonly in wet depressions in shrub-rich fen (Vegetation Type 4) along Emily Creek.

9) *Geocaulon lividum* (Northern Bastard-toadflax)

[New Peterborough - Durham area record]

The species has a transcontinental distribution and is common in moist, calcareous coniferous forests in western Canada and, to a lesser degree, northern Ontario. It is very rare in southern Ontario, being known in Central Region only from two sites in Simcoe County (Riley 1989B). It was reported by J. Kaiser during his 1986 survey of the study area, from a lowland coniferous (Vegetation Type 8) northwest of the Emily Creek crossing of Emily Township Road 14 (J. Kaiser, pers. comm.).

10) *Ranunculus fascicularis* (Yellow Water Buttercup)

[Rare in Central Region]

This southern (calcicolous ?) species of shallow water and emergent mud in hardwood swamps is nearing the northern limit of its range in this part of Ontario. Large populations of non-flowering plants were found in mixed and deciduous swamps (Vegetation Types 9 and 10) in the northeast arm of the wetland.

11) *Ribes lacustre* (Bristly Black Currant)

It is a transcontinental boreal species that extends southward across the largely acidic Canadian Shield in Ontario in wet, boggy, shaded depressions; it is local and uncommon on the calcareous sedimentary lowlands of southern Ontario (Soper and Heimburger 1982) and is uncommon to rare across Central Region (Riley 1989). It is also found locally at the Warsaw Caves ANSI (Brunton 1990B); in the Emily Creek ANSI study area it is found in White Cedar - Larch (Vegetation Type 8) forest along the 9th line allowance northeast of Emily Lake.

12) *Lobelia kalmii* (Kalm's Lobelia)

[New Peterborough - Durham area record]

Like *Eleocharis tenuis* and *Cladium mariscoides* (above), this attractive little plant is a widespread species of wet, calcareous sites in northern Ontario that is commonly found in southern Ontario only in fen complexes (Riley 1989). It was observed in graminoid fen (Vegetation Type 3) west of Emily Creek by J. L. Riley (in lit, 1985).

13) *Bidens tripartita* (Three-parted Beggar's-ticks)

[New Peterborough - Durham area record]

Another northern species of wet, peaty, slightly acidic sites, this composite is found sparingly in fens and saturated graminoid bog mats across southcentral Ontario and rarely south of there. It was found in the Emily Creek ANSI in wet pool margins in shrub-rich fens along the west side of Emily Creek.

LOCALLY SIGNIFICANT FLORA

A number of species in the study area are uncommon in the general area and are worth highlighting to some degree. They are listed, without further comment, below. Riley (1989B) is a useful source for putting these marginally significant taxa of the Emily Creek ANSI study area into perspective.

The locally significant taxa are as follows:

Picea mariana
Triglochim maritinum
Sagittaria graminea
Rumex orbiculatus
Salix candida
Cuscuta gronovii
Utricularia minor
Bidens beckii
Galium labradoricum

3) Significant Fauna

Faunal data were gathered incidentally to floral and vegetational studies. As such, discussions and conclusions in regards to faunal data are preliminary and inconclusive.

BIRDS

Four of the bird species observed in the Emily Creek ANSI study area during this investigation, or identified for the area during a review of breeding data in Cadman *et al.* (1987) (Appendix B) are considered to be of particular life science significance.

Ring-necked Duck

This northern and western species has spread across central and northern Ontario during the last 40 years but remains uncommon as a breeding species south of the Canadian Shield (McNicol 1987). It is rare in Central Region (Riley and Gould 1990). McNicol (1987) indicates it as a confirmed breeding species of this area, most likely in shrub fen or marsh (Vegetation Types 4 or 2).

Black Tern

The Ontario population of this formerly common inhabitant of cat-tail marshes across the province has declined alarmingly in the last 20 years in Ontario (Dunn 1987) and it is now considered to be a species of special concern and regionally significant (Riley and Gould 1990). It is a confirmed breeding species of wetlands in much of the Peterborough area (Dunn 1987), including the Emily Creek area. It most likely breeds on muskrat houses or similar vegetation platforms in cat-tail Marsh (Vegetation Type 2).

Caspian Tern

Two of this species, considered rare in Ontario, were observed resting on stumps in the marsh with a large number of Ring-billed and Herring Gulls. They were undoubtedly passing migrants (cf. Tozer and Richards 1974). The study area might well be a regular feeding and staging area for this species during post-breeding dispersal and migration.

Philadelphia Vireo

Much like the Ring-necked Duck (above), this upland species breeds across the Canadian Shield of Ontario but is found only rarely as a breeding species south of the Shield (James 1987). It is listed as rare in Central Region (Riley and Gould 1990). It breeds in open, successional deciduous forests - primarily Trembling Aspen. It is reported as a probable breeding species from the Emily Creek area in the Ontario Breeding Bird Atlas (James 1987), likely from poplar forest (Vegetation Type 10) along the edge of the wetland.

In addition to these species, the habitat in the study area has been rated as significant for various waterfowl. The wetlands of the study area have been designated as Class 1 wetland (KRCA 1985), in part in recognition of the significance of the marsh and open aquatic areas (Vegetation Types 1 and 2) to breeding and migratory waterfowl.

MAMMALS

No significant mammals were observed during this study; the few observations made are supplemented by species for which (1) suitable habitat and (2) the range within which they might normally be expected to be active, are both within the study area (cf. Peterson 1966). A list of observed and expected species is included in Appendix D.

KRCA (1985) describes the study area as a deer wintering site. No sightings of White-tailed Deer were made during the present study.

AMPHIBIANS AND REPTILES

No significant amphibians or reptiles were observed during this study of the Emily Creek ANSI, nor could the presence of any be inferred from potential habitat at the study area and reference to literature (Cook 1984; Plourde *et al.* 1988; Weller and Oldham 1988). A list of observed and expected species is included in Appendix D.

4) Significant Areas

As discussed in the Significant Vegetation discussion above, the diversity of fen and fen-related wetland vegetation is better represented here than anywhere else in Site District 6-8 (Hanna 1980). The fens occur in a complex of wetland types which, overall,is also one of the least disturbed and most extensive in the site district.

The surrounding upland area is required to provide protection for the wetland complex from adjacent land-uses. It is already very narrow, however, and is considered inadequate in many areas (this study).

Designation of the entire Emily Creek ANSI area as a Provincially Significant site is appropriate.

A wetlands evaluation was conducted in August 1982 (KRCA 1985) and concluded that this area constituted a Class 1 (Provincially Significant) Wetland. The rating relies chiefly on the size and hydrological value of the area, its habitat significance for migratory waterfowl and its importance as a fish spawning area.

CHAPTER 4. PLANNING CONSIDERATIONS

1) Evaluation of Life Science Resources

The five criteria utilized to evaluate the ecological significance of ANSI areas (Lindsay 1986; Hanna 1980) are useful in delineating significant areas and features when applied to the entire study area.

Representation

The fen and fen-related vegetation (Vegetation Types 3, 4, 5, 8) are exceptionally well represented in the Emily Creek ANSI and constitute provincially significant values as the best example of this wetland complex in the site district. They constitute a large proportion of the study area.

Diversity

The diversity of the wetland systems is somewhat reduced by the impact of flooding resulting from artificially maintained water levels along the Trent - Severn Waterway. Upland systems are generally young, reflecting more recent human disturbance.

Condition

The treed fen and other coniferous swamp forests of the study area appear to be in virtually natural condition, although the impact of flooding is still evident in the open graminoid fen and (especially) in the shrub-rich fen, marsh vegetation and open water aquatics areas. Run-off of agricultural pollutants and direct fouling of the water by cattle undoubtedly has seriously affected water quality as it has in other such sites (e.g. along the Indian River, Warsaw Caves ANSI - Brunton 1990). The heavily grazed pasture running to the shore of Emily Creek at the north end of the study area (where cattle were observed in the water) undoubtedly is contributing significantly to water quality degradation along the creek.

Ecological Considerations

The size of the wetland vegetation complex in the Emily Creek ANSI study area - one of the largest such sites in southern Ontario (Riley 1988) - is a significant natural asset. Buffering between these wetlands and adjacent upland land-uses which do not conform with the protection objective concerns for the study area is minimal, however, and inadequate in some areas.

Special Features

The Significant Features (Chapter 3, page 31) include 13 regionally significant vascular plants and 4 bird species of regional significance.

2) Conclusions

The major conclusions that may be drawn from the findings of this evaluation of the Emily Creek ANSI study are as follows:

1. The Emily Creek ANSI constitutes the largest wetland and fen complex in Site District 6-8 and while still recovering from disturbance from past adjustment to the water levels, the entire area constitutes a Provincially Significant ANSI.

2. Adjacent agricultural development (especially cattle grazing) offers an on-going negative influence on water quality in the Emily Creek ANSI study area and beyond.

3) Recommendations

The following recommendations are offered to assist in the protection of the significant natural values of the Emily Creek ANSI area:

Resource Protection

1. A co-operative program with the Kawartha Region Conservation Authority, the Ontario Ministry of Natural Resources, the Ontario Ministry of the Environment and local municipalities should be developed to improve water quality along Emily Creek and then to maintain it at a reasonable level, in part to protect the sensitive aquatic and peatland vegetation features in the study area.

Boundaries

2. The boundaries for the Emily Creek ANSI are adequate to enclose the most critical values of the study area (the fen and marsh vegetation) but should be expanded along the eastern shore of Emily Lake and the northern shore of the northwestern portion of Emily Creek to provide better protection for these wetlands from adjacent land-uses.

Zoning

3. Public lands within the Emily Creek ANSI, about 300 acres, should be managed, as much as possible, as nature reserve lands, in their present natural state. With the private landowners of this site, the Ontario Ministry of Natural Resources should encourage protection of the ANSI through co-operative stewardship strategies.

APPENDIX 1: VASCULAR PLANTS OF EMILY CREEK ANSI

The following lists 287 taxa of vascular plants recorded in the Emily Creek ANSI during this life science inventory. Those names followed by a four digit number (the D. F. Brunton collection number) are represented by voucher specimens collected during the study. All of these are deposited in the herbarium of the Royal Ontario Museum (TRT), except for pteridophyte specimens which have been placed in the herbarium of the University of Guelph (OAC). Sources other than Brunton are DW - D. White, JR - J. Riley and JK - J. Kaiser.

Names followed by (**) indicate taxa considered to be introduced to this area by the activities of man.

Nomenclature follows the Central Region Vascular Plant list (Riley 1989). Departures from that reference are indicated by the Central Region list name being in brackets following the preferred name.

TAXA	COMMON NAME	STATUS	HABITATS(S)
EQUISETACEAE	HORSETAIL FAMILY		
Equisetum arvense L.	Field Horsetail	C	10; 13
Equisetum fluviatile L.	Water Horsetail	R	1; 3
OSMUNDACEAE	ROYAL FERN FAMILY		
Osmunda cinnamomea L.	Cinnamon Fern	U	6
Osmunda regalis L.	American Royal Fern	R	7
DENNSTAEDTIACEAE	BRACKEN FAMILY		
Pteridium aquilinum (L.)Kuhn	Eastern Bracken	U	9; 11
THELYPTERIDACEAE	BEECH FERN FAMILY		
Thelypteris palustris (Salisb.)Schott	Marsh Fern	C	3; 4; 5; 6; 7
ASPLENIACEAE	SPLEENWORT FAMILY		
Athyrium filix-femina (L.)Roth	Northeastern Lady Fern	U	6; 7
Cystopteris bulbifera (L.)Bernh.	Bulblet Fern	DW(1971)	
Dryopteris carthusiana (Vill.)Fuchs	Spinulose Wood Fern	DW(1971)	
Dryopteris cristata (L.)Gray [9514]	Crested Wood Fern	U	8
Dryopteris intermedia (Muhl.)Gray	Glandular Wood Fern	U	5; 7
Dryopteris marginalis (L.)Gray	Marginal Wood Fern	C	2; 6; 8
Gymnocarpium dryopteris (L.)Newm.	Oak Fern	DW(1971)	

Matteuccia struthiopteris (L.)Todaro	American Ostrich Fern	DW(1971)	
Onoclea sensibilis L.	Sensitive Fern	JK(1986)	
PINACEAE	PINE FAMILY		
Abies balsamea (L.)Mill.	Balsam Fir	C	8; 9
Larix laricina (Du Roi)K.Koch	Tamarack	U	3; 8
Picea glauca (Moench)Voss	White Spruce	U	9; 11
Picea mariana Marsh.	Black Spruce	U	4; 8
Pinus strobus L.	White Pine	U	9
CUPRESSACEAE	CYPRESS FAMILY		
Thuja occidentalis L.	White Cedar	C	4; 5; 7; 8; 9
TYPHACEAE	CATTAIL FAMILY		
Typha angustifolia L.	Narrow-leaved Cattail	JK(1986)	
Typha angustifolia x latifolia		U	2
Typha latifolia L.	Common Cattail	C	2; 3; 4; 5
SPARGANIACEAE	BUR-REED FAMILY		
Sparganium americanum Nutt. [9491B]	Nuttall's Bur-reed	U	1
POTAMOGETONACEAE	PONDWEED FAMILY		
Potamogeton epihydrus Raf.	Pondweed	C	1
Potamogeton pectinatus L.	Sago Pondweed	C	1
Potamogeton richardsonii (A. Benn.) Rydb [9508]	Pondweed	U	1
Potamogeton robbinsi Oakes [9507]	Pondweed (PAGE 35)	U	1
Potamogeton zosteriformis Fern.	Flat-stemmed Pondweed	C	1
JUNCAGINANCEAE	ARROW-GRASS FAMILY		
Triglochin maritimum L.	Arrow-grass	JR(1985)	3 (JLR)

ALISMATACEAE	WATER-PLANTAIN FAMILY		
Alisma triviale Pursh	Water-plantain	U	2; 3
Sagittaria graminea Michx.	Grass-leaved Arrowhead	JK(1986)	
Sagittaria latifolia Willd.	Common Arrowhead	U	1; 2; 4
HYDROCHARITACEAE	FROG'S-BIT FAMILY		
Elodea canadensis Michx.	Water-weed	C	1
Vallisneria americana Michx.	Tape Grass	C	1
POACEAE	GRASS FAMILY		
Agropyron repens (L.)Beauv.**	Quack Grass	U	3
Agrostis gigantea Roth **	Redtop	R	12; 13
Agrostis stolonifera L.	Creeping Bent Grass	R	13
Agrostis scabra Willd.	Ticklegrass	R	4 (on logs)
Alopecurus aequalis Sobol. [9513]	Short-awned Foxtail	R	6
Bromus ciliatus L.	Fringed Brome Grass	R	4
Bromus inermis Leyss.**	Smooth Brome Grass	U	12; 13
Calamagrostis canadensis (Michx.)Nutt.	Canada Blue-joint	U	4; 5
Dactylis glomerata L.**	Orchard Grass	U	12; 13
Digitaria ischaemum (Schreb.)Muhl.**	Smooth Crabgrass	R	13
Digitaria sanguinalis (L.)Scop.**	Large Crabgrass	R	13
Echinochloa crusgalli (L.)Beauv.**	Barnyard Grass	U	13
Elymus virginicus L.	Virginia Wild-rye	R	6
Festuca pratensis Huds.**	Meadow Fescue	R	13
Glyceria grandis S.Wats.	Tall Manna Grass	U	7
Glyceria striata (Lam.)A.S.Hitchc.	Fowl Manna Grass	C	5; 6; 7
Leersia oryzoides (L.)Sw.	Cut Grass	U	4; 5; 6
Muhlenbergia glomerata (Willd.)Trin.	Muhly Grass	C	3; 4
Muhlenbergia mexicana (L.)Trin.	Muhly Grass	U	7; 13
Panicum capillare L.	Witch Grass	U	13
Phalaris arundinacea L.	Reed Canary Grass	C	2; 4

Phleum pratense L. **	Timothy	U	12; 13
Poa compressa L.**	Canada Blue Grass	JK(1986)	
Poa palustris L.	Fowl Manna Grass	R	7; 8
Poa pratensis L.	Kentucky Blue Grass	U	12; 13
Setaria glauca (L.)Beauv. **	Yellow Foxtail	U	13
Setaria viridis (L.)Beauv.**	Green Foxtail	R	13
Zizania palustris L. [9504] (PAGE 35)	Northern Wild-rice	C	1; 2

CYPERACEAE	SEDGE FAMILY		
Carex aquatilis Wahl.	Sedge	U	3; 4
Carex bebbii Olney	Sedge	U	5; 7
Carex comosa Boott	Sedge	U	3; 4
Carex crinita Lam.	Sedge	U	7
Carex disperma Dew.	Sedge	C	8
Carex interior Bailey	Sedge	U	3; 4
Carex lacustris Willd.	Sedge	JK(1986)	
Carex lasiocarpa Ehrh.	Sedge	C	3; 4
Carex limosa L.	Sedge	U	3
Carex pseudocyperus L.	Sedge	R	2
Carex retrorsa Schw.	Sedge	U	2; 5
Cladium mariscoides (Muhl.) Torrey [9492]	Twig-rush (PAGE 35)	C	3; 4
Eleocharis acicularis (L.)R.& S.	Spike-rush	R	3
Eleocharis obtusa (Willd.)Schultes	Spike-rush	U	1; 2; 4
Eleocharis palustris (L.)R.& S.	Spike-rush	U	1; 4
Eleocharis tenuis (Willd.)Schultes var. borealis (Svenson)Boivin (= E. elliptica Kunth) [9496] (PAGE 36)		C	3
Eriophorum viridi-carinatum (Engelm.)Fern.	Cotton-grass	R	3
Rhynchospora alba (L.)Vahl	Beak-rush [page 36]	U	3
Scirpus atrovirens Willd.	Black Bulrush	R	4
Scirpus cyperinus (L.)Kunth	Wool-grass	U	2; 3; 4
Scirpus lacustris L. var. glaucus (Sm.)Bock (= S. validus)	Softstem Bulrush	C	1; 2

ARACEAE	ARUM FAMILY		
Acorus americanus Raf.	Sweet Flag	JK(1986)	
Calla palustris L.	Water-arum (Wild Calla)	U	1; 2; 3; 4

LEMNACEAE	DUCKWEED FAMILY		
Lemna minor L.	Common Duckweed	U	1; 2; 4
Lemna trisulca L.	Star Duckweed	JK(1986)	
Spirodela polyrhiza (L.)Schleid. [9497]	Greater Duckweed	R	3
Wolffia borealis (Engelm.)Land. [9515]	Water-meal (PAGE 36)	R	2
Wolffia columbiana Karst. [9516]	Water-meal (PAGE 36)	R	2
PONTEDERIACEAE	PICKERELWEED FAMILY		
Pontederia cordata L.	Pickerelweed	U	1; 4
Zosterella dubia (Jacq.)Small (= Heteranthera dubia) [9491B]	Water Star-grass	C	1
JUNCACEAE	RUSH FAMILY		
Juncus bufonius L.	Toad Rush	JK(1986)	
Juncus pelocarpus E. Mey. [9501]	Rush (PAGE 37)	U	3; 4
LILIACEAE	LILY FAMILY		
Maianthemum canadense Desf. var. canadense	Wild Lily-of-the-valley	U	8; 9
Smilacina stellata (L.)Desf.	False Solomon's-seal	R	4
Smilacina trifolia (L.)Desf.	Three-leaved False Solomon's-seal	U	3; 4
Smilax hispida L.	Bristly Greenbrier	JK(1986)	
IRIDACEAE	IRIS FAMILY		
Iris versicolor L.	Wild Blue Flag	C	1; 2
ORCHIDACEAE	ORCHID FAMILY		
Epipactis helleborine (L.)Crantz **	Helleborine	U	7
Liparis loeselii (L.)Rich.	Loesel's Twayblade	U	3

Malaxis monophyllos (L.)Sw.	Adder's Mouth	U	8
Platanthera hyperborea	Northern Green Orchid	JR(1985)	3 (JLR)
Spiranthes romanzoffiana Cham.[9492]	Hooded Ladies'-tresses	U	3
SALICACEAE	WILLOW FAMILY		
Populus balsamifera L.	Balsam Poplar	U	6; 7
Populus tremuloides Michx.	Trembling Aspen	U	9
Salix bebbiana Sarg.	Beaked Willow, Bebb's Willow	C	5
Salix candida Flügge	Hoary Willow	C	5; 7; 3(JLR)
Salix discolor L.	Pussy Willow	JK(1986)	
Salix lucida Muhl.	Shining Willow	C	5
Salix petiolaris Sm.	Slender Willow	C	5; 7
MYRICACEAE	BAYBERRY FAMILY		
Myrica gale L.	Sweet Gale	C	3; 4
BETULACEAE	BIRCH FAMILY		
Alnus rugosa (Du Roi)Spreng.	Speckled Alder	C	2; 3; 4; 5; 7; 8
Betula alleghaniensis Britt.	Yellow Birch	U	7
Betula papyrifera Marsh.	White Birch	U	9
Betula pumila L.	Dwarf or Swamp Birch	U	3; 4
FAGACEAE	BEECH FAMILY		
Quercus macrocarpa Michx.	Bur Oak	U	7
ULMACEAE	ELM FAMILY		
Ulmus americana L.	White Elm	U	7
URTICACEAE	NETTLE FAMILY		
Boehmeria cylindrica (L)Sw.	False Nettle	R	6
Pilea pumila (L.)Gray	Clearweed	R	6
Urtica dioica L. ssp. gracilis (Ait.)Selander	American Stinging Nettles	R	5

SANTALACEAE	SANDALWOOD FAMILY		
Geocaulon lividum (Richard.)Fern.	Toadflax [page 37]	JK(1986)	
POLYGONACEAE	BUCKWHEAT FAMILY		
Polygonum achoreum Blake (9521)	Striate Knotweed	R	13
Polygonum amphibium L.	Water Smartweed	U	4
Polygonum aviculare L. **	Prostate Knotweed	U	13
Polygonum hydropiper L.	Marshpepper Smartweed	U	5
Polygonum lapathifolium L.	Willow-weed	R	5
Rumex crispus L. **	Curly Dock	C	2; 4; 5
Rumex orbiculatus L.	Great Water Dock	U	3; 4
CHENOPODIACEAE	SPINACH FAMILY		
Chenopodium album L. **	Lamb's-quarters, Pigweed	R	13
AMARANTHACEAE	AMARANTH FAMILY		
Amaranthus albus L. (9520)	Tumbling Pigweed	R	13
Amaranthus retroflexus L. **	Redroot Pigweed	R	13
CARYOPHYLLACEAE	PINK FAMILY		
Cerastium fontanum Baumg. **	Mouse-eared Chickweed	C	12; 13
CERATOPHYLLACEAE	HORNWORT FAMILY		
Ceratophyllum demersum L.	Common Coontail	C	1
NYMPHAEACEAE	WATER-LILY FAMILY		
Nuphar variegatum Engelm.	Bulhead Lily	C	1; 3 (JLR)
Nymphaea odorata Ait.	Fragrant Water-lily	C	1
RANUNCULACEAE	CROWFOOT FAMILY		
Caltha palustris L.	Marsh-marigold	U	5; 6; 7
Clematis virginiana L.	Virgin's-bower	R	7
Coptis trifolia (L.)Salisb.	Gold-thread	JK(1986)	

Ranunculus acris L. **	Tall Buttercup	U	12
Ranunculus flabellaris Raf.	Yellow Water Buttercup	[PAGE 38]	R6; 7
Thalictrum pubescens Pursh	Tall Meadow Rue	C	3; 4; 5
BRASSICACEAE	MUSTARD FAMILY		
Rorippa palustris (L.)Bess. var. fernaldiana (Butt. & Abbe)Stuckey	Marsh Yellow Cress	U	2; 4
SARRACENIACEAE	PITCHER-PLANT FAMILY		
Sarracenia purpurea L.	Pitcher-plant	C	3; 4
DROSERACEAE	SUNDEW FAMILY		
Drosera rotundifolia L.	Round-leaved Sundew	C	3; 4
SAXIFRAGACEAE	SAXIFRAGE FAMILY		
Tiarella cordifolia L.	Foam Flower	U	8
GROSSULARIACAEAE	GOOSEBERRY FAMILY		
Ribes americanum Mill.	Wild Black Currant	R	6
Ribes cynosbati L.	Prickly Gooseberry	R	9
Ribes glandulosum Grauer	Skunk Currant	C	7; 8
Ribes lacustre (Pers.)Poir.	Swamp Black Currant [PAGE 38]		R8
ROSACEAE	ROSE FAMILY		
Amelanchier spicata K. Koch var. spicata	Juneberry, Swerviceberry	JK(1986)	
Fragaria virginiana Duchesne	Common Strawberry	JK(1986)	
Potentilla fruticosa L.	Shrubby Cinquefoil	C	3; 4
Potentilla norvegica L.	Rough Cinquefoil	U	13
Potentilla palustris (L.)Scop.	Marsh Cinquefoil	C	2; 3; 4
Potentilla recta L. **	Rough-fruited Cinquefoil	U	12; 13
Prunus virginiana L.	Chokecherry	C	5; 6; 7
Rosa palustris Marsh.	Swamp Rose	JK(1986)	

Rubus allegheniensis Porter	Common Blackberry	R	12
Rubus odoratus L.	Flowering Raspberry	R	9
Rubus pubescens Raf.	Dwarf Raspberry	U	8
Rubus strigosus Michx.	Wild Red Raspberry	U	12; 13
FABACEAE	PEA FAMILY		
Medicago lupulina L. **	Black Medic	U	13
Melilotus alba Desr. **	White Sweet-clover	C	13
Melilotus officinalis (L.)Desr. **	Yellow Sweet-clover	C	13
Trifolium pratense L.	Red Clover	U	13
Trifolium repens L. **	White Clover	C	12; 13
Vicia cracca L. **	Bird Vetch	U	12
OXALIDACEAE	WOOD-SORREL FAMILY		
Oxalis stricta L.	Common Wood-sorrel	R	13
EUPHORBIACEAE	SPURGE FAMILY		
Euphorbia cyparissias L.**	Cypress Spurge	R	13
Euphorbia maculata L. (9519)	Hairy-fruited Spurge	R	13
ANACARDIACEAE	CASHEW FAMILY		
Rhus typhina L.	Staghorn Sumac	R	12
Toxicodendron rydbergii (Rydb.)Greene	Poison Ivy	C	6; 7; 9
AQUIFOLIACEAE	HOLLY FAMILY		
Ilex verticillata (L.)Gray	Winterberry	U	5
CELASTRACEAE	STAFF-TREE FAMILY		
Celastrus scandens L.	Climbing Bittersweet	R	9
ACERACAE	MAPLE FAMILY		
Acer negundo L.	Manitoba Maple	R	12
Acer rubrum L.	Red Maple	U	7; 9
Acer saccharinum L.	Silver Maple	U	6; 7

Acer saccharum Marsh.	Sugar Maple	R	11
Acer spicatum Lam.	Mountain Maple	U	7
BALSAMINACEAE	TOUCH-ME-NOT FAMILY		
Impatiens capensis Meerb.	Spotted Jewelweed, Touch-me-not	C	2; 4; 5; 6; 7
RHAMNACEAE	BUCKTHORN FAMILY		
Rhamnus alnifolius L'Her	Alder-leaved Buckthorn	C	4; 5; 7; 8
VITACEAE	GRAPE FAMILY		
Parthenocissus vitacea (Knerr)Hitchc.	Virginia Creeper	U	6; 7
Vitis riparia Michx.	Riverbank Grape	U	5; 6
TILIACEAE	LINDEN FAMILY		
Tilia americana L.	Basswood	U	9
CLUSIACAE	ST. JOHN'S-WORT FAMILY		
Hypericum perforatum L. **	Common St. John's-wort	C	13
Triadenum fraseri (Spach)Gl.	Marsh St. John's-wort	C	2; 3; 4
LYTHRACEAE	LOOSESTRIFE FAMILY		
Decodon verticillatus (L.)Ell. (9503)	Water Willow	C	2; 4
Lythrum salicaria L. **	Purple Loosestrife	R	5
ONAGRACEAE	EVENING-PRIMROSE FAMILY		
Circaea lutetiana L.	Enchanter's Nightshade	R	6
Epilobium ciliatum Raf. ssp. glandulosum (Lehm)Hoch & Raven	Sticky Willowherb	R	2
Epilobium leptophyllum Raf.	Willowherb	R	4
Oenothera parviflora L.	Small-flowered Evening-primrose	U	12; 13

HALORAGIDACEAE	WATER MILFOIL FAMILY		
Myriophyllum spicatum L. **	Eurasian Water-milfoil	C	1
ARALIACEAE	GINSENG FAMILY		
Aralia nudicaulis L.	Wild Sarsaparilla	U	8; 9
APIACEAE	CARROT FAMILY		
Cicuta bulbifera L.	Bulbous Water-hemlock	C	2; 4
Daucus carota L. **	Wild Carrot, Queen Lace	R	13
Sanicula marilandica L.	Black Snakeroot	JK(1986)	
Sium suave Walt.	Water-parsnip	DW(1971)	
CORNACEAE	DOGWOOD FAMILY		
Cornus amomum Raf.	Silky Dogwood	U	5
Cornus canadensis L.	Bunchberry	U	8
Cornus stolonifera Michx.	Red-osier Dogwood	C	5; 6; 7; 3(JLR)
ERICACEAE	HEATH FAMILY		
Andromeda glaucophylla Link	Bog-rosemary	C	3; 4
Chaemadaphne calyculata (L.)G. Don	Leatherleaf	JK(1986)	
Kalmia polifolia Wang.	Bog-laurel	C	3; 4
Ledum groenlandicum Oeder	Labrador-tea	C	3; 4
Vaccinium macrocarpon Ait.	Large Cranberry	U	3
Vaccinium oxycoccus L.	Small Cranberry	JK(1986); JR(1985)	3 (JLR)
PRIMULACEAE	PRIMROSE FAMILY		
Lysimachia ciliata L.	Fringed Loosestrife	R	7
Lysimachia terrestris (L.)BSP.	Swamp Candles	JK(1986)	
Lysimachia thyrsiflora L.	Tufted Loosestrife	JK(1986)	
Trientalis borealis Raf.	Star-flower	U	9

OLEACEAE	OLIVE FAMILY		
Fraxinus americana L.	White Ash	U	9
Fraxinus nigra Marsh.	Black Ash	C	6; 7
Fraxinus pennsylvanica Marsh.	Red Ash	U	7
GENTIANACEAE	GENTIAN FAMILY		
Gentiana andrewsii Griseb.	Closed Gentian	JK(1986)	
MENYANTHACEAE	BUCKBEAN		
Menyanthes trifoliata L.	Bog Buckbean	C	3; 4
APOCYNACEAE	DOGBANE FAMILY		
Apocynum androsaemifolium L.	Spreading Dogbane	U	12
ASCLEPIADACEAE	MILKWEED FAMILY		
Asclepias incarnata L.	Swamp Milkweed	C	2; 3; 4; 5
Asclepias syriaca L.	Common Milkweed	R	13
CONVOLVULACEAE	MORNING GLORY FAMIOY		
Convolvulus sepium L.	Wild Morning Glory	R	5
Cuscuta gronovii Willd. (9493)	Swamp Dodder	C	4
BORAGINACEAE	BORAGE FAMILY		
Lithospermum officinale L.	Pearl or Common Gromwell	R	13
VERBENACEAE	VERVAIN FAMILY		
Verbena hastata L.	Blue Vervain	U	3; 4
LAMIACEAE	MINT FAMILY		
Lycopus uniflorus Michx.	Water-horehound	C	2; 3; 4
Mentha arvensis L.	Field or Common Mint	U	2
Prunella vulgaris L. **	Heal-all	JK(1986)	

Scutellaria galericulata L.	Common Skullcap	U	2; 5
Scutellaria lateriflora L.	Mad-dog Skullcap	R	2; 5
SOLANACEAE	NIGHTSHADE FAMILY		
Solanum dulcamara L. **	Bittersweet	U	5; 7
SCROPHULARIACEAE	FIGWORT FAMILY		
Agalinis paupercula (Gray)Britt. (9399)	Agalinus	U	3;
Chaenorrhinum minus (L.)Lange **	Dwarf Snapdragon	R	13
Chelone glabra L.	Turtlehead	R	2
Linaria vulgaris Mill **	Toadflax, Butter-and-eggs	U	13
Verbascum thapsus L. **	Common Mullein	R	12; 13
LENTIBULARIACEAE	BLADDERWORT FAMILY		
Utricularia intermedia Hayne	Flat-leaved Bladderwort	U	3
Utricularia minor L.	Small Bladderwort	JR(1985)	3 (JLR)
Utricularia vulgaris L.	Common Bladderwort	C	1
PLANTAGINACEAE	PLANTAIN FAMILY		
Plantago lanceolata L.	English Plantain	U	12; 13
Plantago major L. **	Broad-leaved Plantain	U	12; 13
RUBIACEAE	MADDER FAMILY		
Galium labradoricum (Wieg.)Wieg. (9500)	Bedstraw	C	3
Galium palustre L.	Marsh Bedstraw	JK(1986)	
Galium trifidum L.	Bedstraw	JK(1986)	
Galium triflorum Michx.	Sweet-scented Bedstraw	JK(1986)	
CAPRIFOLIACEAE	HONEYSUCKLE FAMILY		
Linnaea borealis L.	Twinflower	R	8; 9
Lonicera dioica L.	Wild Honeysuckle	JK(1986)	
Lonicera oblongifolia (Goldie)Hook.	Swamp Fly-honeysuckle	R	8
Sambucus canadensis L.	Common Elder	R	7
Viburnum lentago L.	Nannyberry	U	5

Viburnum opulus L. var. americanus Ait. (9506)	Highbush-cranberry	U	5
CAMPANULACEAE	**BLUEBELL FAMILY**		
Campanula aparinoides Pursh	Marsh-bellflower	U	3; 4
Campanula rapunculoides L. **	Creeping Bellflower	R	13
LOBELIACEAE	**LOBELIA FAMILY**		
Lobelia kalmii L. [PAGE 38]	Kalm's Lobelia	JR(1985)	3 (JLR)
ASTERACEAE	**ASTER FAMILY**		
Achillea millefolium L.	Yarrow	R	13
Arctium minus Bernh. **	Common Burdock	R	12
Aster borealis (T.& G.)Prov. (9495)	Bog Aster	C	3; 4
Aster ciliolatus Lindl.	Aster	U	7
Aster cordifolius L.	Heart-leaved Aster	C	7
Aster lanceolatus Willd.	Tall White Aster	U	2; 9
Aster lateriflorus (L.)Britt.	Aster	U	6
Aster puniceus L.	Red-stemmed Aster	U	6; 8
Bidens beckii Torr.	Marsh Beggarticks	JK(1986)	
Bidens cernua L.	Nodding Beggarticks	U	3; 4; 5
Bidens tripartita L. (9502) [PAGE 38]	Beggarticks	R	3
Chrysanthemum leucanthemum L. **	Ox-eye Daisy	R	13
Cichorium intybus L. **	Chicory	R	13
Cirsium arvense (L.)Scop. **	Canada Thistle	JK(1986)	
Cirsium vulgare (Savi)Tenore **	Bull Thistle	JK(1986)	
Erigeron strigosus Muhl.	Rough Fleabane	R	13
Eupatorium maculatum L.	Spotted Joe-Pye Weed	U	5; 7
Eupatorium perfoliatum L.	Boneset	R	4
Euthamia graminifolia (L.)Nutt.	Narrow-leaf Goldenrod	R	4
Hieracium aurantiacum L. **	Orange Hawkweed, Devil's Paintbrush	JK(1986)	
Lactuca biennis (Moench)Fern.	Tall Blue Lettuce	R	7
Matricaria matricarioides (Less.)Porter **	Pineapple Weed	R	13
Solidago canadensis L.	Canada Goldenrod	U	7; 9

Solidago nemoralis Ait.	Gray Goldenrod	R	12
Solidago rugosa Mill.	Rough Goldenrod	U	5; 6
Solidago uliginosa Nutt.	Bog Goldenrod	C	3; 4
Sonchus arvensis L. **	Perennial Sow-thistle	R	13
Taraxacum officinale Weber **	Dandelion	U	12; 13
Tragopogon pratensis L. **	Meadow's Goat's-beard	R	12
Virigulus novae-angliae (L.)Rev.& Keen.	New England Aster	R	12

APPENDIX 2: BIRD SPECIES OBSERVED IN THE EMILY CREEK ANSI

The following lists the species of birds observed during the September 1989 life science inventory of the Emily Creek ANSI. Nomenclature and species order follows Godfrey (1986). Species indicated only from Ontario Breeding Bird Atlas data (Cadman *et al.* 1987) and therefore known to breed close to or within the study area, are marked with an asterisk (*). Regionally significant species (including breeding species known to occur in less than 20 Ontario Breeding Bird Atlas squares in MNR Central Region - Riley and Gould 1990) are indicated by **bold type** (see discussion on page 39).

Common Loon

Great Blue Heron

Mallard
Ring-necked Duck *

Osprey (in lit.)
Red-tailed Hawk
Turkey Vulture

American Kestrel

Killdeer

Ring-billed Gull
Caspian Tern
Common Tern *
Black Tern *

Mourning Dove

Downy Woodpecker
Northern Flicker
Red-headed Woodpecker *

Horned Lark

Marsh Wren *

Tree Swallow
Barn Swallow

Blue Jay

American Crow*

Black-capped Chickadee

Ruby-crowned Kinglet *

Blue-gray Gnatcatcher

American Robin

Gray Catbird

Cedar Waxwing

European Starling

Red-eyed Vireo
Philadelphia Vireo *

Yellow-rumped Warbler
Black and White Warbler
Common Yellowthroat

Song Sparrow
Swamp Sparrow
Dark-eyed Junco *

Red-winged Blackbird

White-throated Sparrow

Common Grackle

American Goldfinch

APPENDIX 3: MAMMALS OF THE EMILY CREEK ANSI

Few mammals species were actually seen during the September 1989 life science inventory of the Emily Creek ANSI study area. Accordingly, to provide a more meaningful set of data a list has been compiled of species that contain the study area within their range and for which suitable habitat exists within the study area. In other words, species likely to be found here following more indepth examination of the mammal fauna. This list is generated from Peterson (1966) and follows his order and nomenclature.

Species observed during this study are underlined. The number in brackets following significant species listings indicates the page in the text where that species is discussed.

Masked Shrew
Smoky Shrew

Big Short-tailed Shrew

Star-nosed Mole

Little Brown Bat
Big Brown Bat

Cottontail Rabbit

Gray Squirrel
Red Squirrel

Woodchuck

Eastern Chipmunk
Northern Flying Squirrel

Beaver
Muskrat

Deer Mouse
White-footed Mouse
Meadow Vole
Meadow Jumping Mouse

Porcupine

Coyote (in lit.)
Red Fox
Raccoon

Ermine
Mink

Striped Skunk

APPENDIX 4: AMPHIBIANS AND REPTILES OF THE EMILY CREEK ANSI

Few amphibian and reptiles were observed during the September 1989 life science inventory of the Emily Creek ANSI study area. So as to provide a more meaningful set of data, a list has been compiled of species that contain the study area within their range and for which suitable habitat exists within the study area. In other words, species likely to be found here following more indepth examination of the herptofauna fauna. This list is generated from Weller and Oldham (1988) and Cook (1984) and follows their order and nomenclature.

Species observed during this study[2] are underlined.

Red-spotted Newt
Jefferson Salamander (s.l.)
Yellow-spotted Salamander
Red-backed Salamander

American Toad

Spring Peeper
Tetraploid Gray Tree Frog
Midland Chorus Frog
Woodfrog
Northern Leopard Frog
Green Frog

Snapping Turtle
Eastern Painted Turtle

Eastern Garter Snake
Norther Water Snake
Northern Redbelly Snake
Eastern Smooth Green Snake

[2] Data on sites, numbers, habitat, etc. are filed with the Ontario Herptofaunal Survey.

AREA OF NATURAL AND SCIENTIFIC INTEREST - LIFE SCIENCE CHECKSHEET

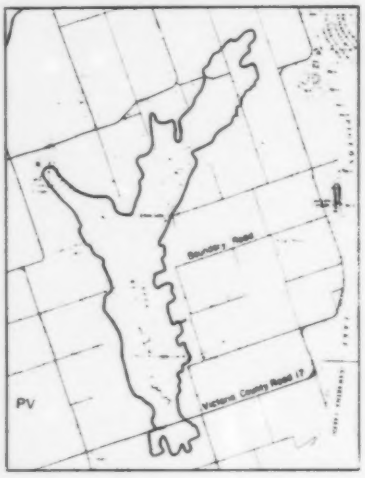
Name	Map Name	Map Number	UTM Ref.
EMILY CREEK ANSI	Lindsay	31 D/7	763875

County, District or Regional Municipality (s)	Latitude	Longitude	Alt.	Min.	Max.
Victoria County	44o 26'	78° 35'		250m	260m

Locality: 10 km southsouthwest of Bobcaygeon — Area ca. 1417 ha.

Townships:
Verulam Township
Emily Township

1 : 250,000 NTS Map Showing Area Boundaries



Owership: Crown and Private

Administration: Ontario Ministry of Natural Resources

Site Region and District	MNR Region and District
6-1	Central (Lindsay)

Aerial Photographs

Year	Roll	Flight Line	Numbers
1971	14	4416	90-91
1971	76	4417	158-159
1971	5	4418	88-89
1971	54	4419	99-102
1971	47	4420	90-91

Physical and Biological Features

The site consists of a huge wetland complex situated in a former glacial spillway in which deep peat deposits have formed (up to 2m deep) over calcareous substrate. Water flow through the open and treed areas of the peatland have encouraged the development of fen and fen-related vegetation types. These are unsurpassed in the site district, despite still being in a recovery phase from a water level increase along the Trent - Severn Waterway.

Thirteen regionally significant plant species were identified as inhabiting the study area. Four regionally significant bird species (including Black Tern, a species of special provincial concern) are also recorded.

Major Information Sources

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Evaluation and Priorities

Provincially significant wetland (fen, treed fen, shrub fen) complex

Date Compiled: July 1990

Compiler: Daniel F. Brunton

Ontario Ministry of Natural Resources, Parks andRecreation Areas Section, Aurora, Ontario L4G 3G8

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MAPS NOT FILMED

CARTES OMISES